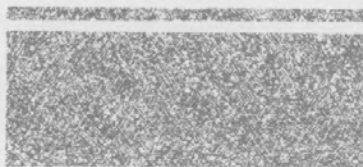


Regan

54th
ANNUAL MEETING
■
SOCIETY FOR AMERICAN ARCHAEOLOGY



PROGRAM
AND
ABSTRACTS



ATLANTA HILTON
April 5-9, 1989



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**PROGRAM AND ABSTRACTS
of the Fifty-Fourth Annual Meeting
Atlanta, Georgia
April 5-9, 1989**

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**PLAN TO ATTEND
SAA'S
55TH ANNUAL MEETING**

**RIVIERA HOTEL
LAS VEGAS, NEVADA**

**APRIL 18-22
1990**

Illustration: Stone totem carved by Haida Indians of Queen Charlotte Island, British Columbia rendered in watercolor in 1870's by James Swan and now part of the Smithsonian's Anthropological Archives.

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

Cover: Late prehistoric incised jar. Creighton Island, GA. After C. B. Moore, *Georgia Coast Mounds*, 1897.

Published by the
Society for American Archaeology
808-17th Street, N.W.
Washington, D.C. 20006

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SOCIETY FOR AMERICAN ARCHAEOLOGY Fifty-Fourth Annual Meeting

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GENERAL INFORMATION

Abstracts Abstracts of papers presented at this meeting are included in the Program. Additional copies are available for \$5 per copy and may be ordered prepaid from the Society, 808-17th Street N.W., Washington, D.C. 20006.

Business Meeting The Society's annual business meeting will begin at 5:30 PM on Friday in the Grand Salon West.

Convention Office Any problems or special requests during the meeting should be reported to the Convention Office in the George Washington Room.

Exhibits Exhibits will be displayed in the Walton/Cherokee/Henry Rooms from 9 AM to 6 PM on Thursday and Friday, and 9 AM to 2 PM on Saturday.

Membership Services and Publications SAA publications will be displayed and membership information will be available in the exhibit room during the exhibit hours.

Message and Information Center A self-service message center will be open in the second floor lobby from 5 PM to 8 PM Wednesday, and from 8 AM to 5 PM Thursday through Saturday.

New Member Reception Officers of the Society will host a reception for students, new members and members attending their first annual meeting on Wednesday at 8 PM in Crystal Ballroom E & F.

Placement Service A placement service will be conducted in Room 452 from 5 PM to 8 PM on Wednesday, from 8 AM to 5 PM Thursday and Friday, and from 8 AM to noon on Saturday. 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 from 5 PM to 8 PM on Wednesday, from 7:30 AM to 3 PM on Thursday, 8 AM to 3 PM on Friday and from 8 AM to noon on Saturday. Members who preregistered by March 13 should claim their badges and programs at the advance registration desk. Wearing of the badge is required for admission to all sessions and the exhibits.

Symposia and Sessions 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.

Session Smoking Ban Smoking during sessions will not be permitted.

Slide Screening Room A 35mm slide projector and screen will be available in Room 438 from Wednesday at 6 PM and thereafter throughout the meeting for presenters who wish to check their slides before presentation.

ANNUAL MEETINGS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY

Meeting	Place	Date
1st	Andover, Massachusetts	December, 1935
2nd	Washington, DC	December, 1936
3rd	Milwaukee, Wisconsin	May, 1938
4th	Ann Arbor, Michigan	May, 1939
5th	Indianapolis, Indiana	April, 1940
6th	Minneapolis, Minnesota	May, 1941
7th	Cincinnati, Ohio	May, 1942
8th	Because of travel difficulties and other wartime restrictions, the business of the annual meeting in 1943 was conducted by mail by the Executive Committee, whose actions were approved at the next annual meeting.	
9th	Washington, DC	May, 1944
10th	Washington, DC	May, 1945
11th	Indianapolis, Indiana	May, 1946
12th	Ann Arbor, Michigan	May, 1947
13th	Milwaukee, Wisconsin	May, 1948
14th	Bloomington, Indiana	May, 1949
15th	Norman, Oklahoma	May, 1950
16th	Evanston, Illinois	May, 1951
17th	Columbus, Ohio	May, 1952
18th	Urbana, Illinois	May, 1953
19th	Albany, New York	May, 1954
20th	Bloomington, Indiana	May, 1955
21st	Lincoln, Nebraska	May, 1956
22nd	Madison, Wisconsin	May, 1957
23rd	Norman, Oklahoma	May, 1958
24th	Salt Lake City, Utah	May, 1959
25th	New Haven, Connecticut	May, 1960
26th	Columbus, Ohio	May, 1961
27th	Tucson, Arizona	May, 1962
28th	Boulder, Colorado	May, 1963
29th	Chapel Hill, North Carolina	May, 1964
30th	Urbana, Illinois	May, 1965
31st	Reno, Nevada	May, 1966
32nd	Ann Arbor, Michigan	May, 1967

33rd	Santa Fe, New Mexico	May, 1968
34th	Milwaukee, Wisconsin	May, 1969
35th	Mexico City, Mexico	May, 1970
36th	Norman, Oklahoma	May, 1971
37th	Bal Harbour, Florida	May, 1972
38th	San Francisco, California	May, 1973
39th	Washington, DC	May, 1974
40th	Dallas, Texas	May, 1975
41st	St. Louis, Missouri	May, 1976
42nd	New Orleans, Louisiana	April, 1977
43rd	Tucson, Arizona	May, 1978
44th	Vancouver, Canada	April, 1979
45th	Philadelphia, Pennsylvania	May, 1980
46th	San Diego, California	April-May, 1981
47th	Minneapolis, Minnesota	April, 1982
48th	Pittsburgh, Pennsylvania	April, 1983
49th	Portland, Oregon	April, 1984
50th	Denver, Colorado	May, 1985
51st	New Orleans, Louisiana	April, 1986
52nd	Toronto, Ont.	May 1987
53rd	Phoenix, Arizona	April 1988

SOCIETY FOR AMERICAN ARCHAEOLOGY

Past Presidents

(*Deceased)

A C Parker *	1935-36	Jesse D Jennings	1959-60
Diamond Jenness *	1936-37	Erik K Reed	1960-61
A V Kidder *	1937-38	Junius Bird *	1961-62
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Emil W Haury	1943-44	Gordon B Willey	1967-68
J Alden Mason *	1944-45	H Marie Wormington	1968-69
Carl E Guthe *	1945-46	Ignacio Bernal	1969-70
Frederick Johnson	1946-47	Robert Lister	1970-71
Douglas S Byers *	1947-48	Richard S MacNeish	1971-72
Waldo R Wedel	1948-49	Charles C DiPeso *	1972-73
J O Brew *	1949-50	Douglas W Schwartz	1973-74
Frank H H Roberts Jr *	1950-51	Charles R McGimsey III	1974-75
James B Griffin	1951-52	Stuart Struever	1975-76
Irving Rouse	1952-53	Raymond H Thompson	1976-77
Gordon Ekholm *	1953-54	Cynthia Irwin-Williams	1977-79
Robert Wauchope *	1954-55	Fred Wendorf	1979-80
W Duncan Strong *	1955-56	Richard E W Adams	1981-83
William A. Ritchie	1956-57	George C Frison	1983-85
George I Quimby Jr	1957-58	Don D Fowler	1985-87
Richard B Woodbury	1958-59	Dena F Dincauze	1987-89

AWARDS TO ARCHAEOLOGISTS

Compiled by N Woodbury

The *Viking Fund Annual Awards in Anthropology* (provided by the WennerGren Foundation) consisted of three Viking Fund Medals, with accompanying Viking Fund Prizes of \$1,000 each. These were awarded annually 1946–60 for distinguished research, publication and contribution to science. Scholars were selected by committees of their respective societies—in archaeology by the Society for American Archaeology, in general anthropology by the American Anthropological Association and in physical anthropology by the American Association of Physical Anthropologists.

The awardees in archaeology are:

- 1946 Alfred Vincent Kidder
- 1947 John Otis Brew
- 1948 Alex Dony Krieger
- 1949 Hallam Leonard Movius, Jr.
- 1950 Emil Walter Haury
- 1951 Frank Harold Hanna Roberts, Jr.
- 1952 Alfonso Caso
- 1953 Gordon Randolph Willey
- 1954 William Duncan Strong
- 1955 John Eric Sidney Thompson
- 1956 Junius Bouton Bird
- 1957 James Bennett Griffin
- 1958 Jesse David Jennings
- 1959 Irving Rouse
- 1960 Samuel Kirkland Lothrop

The *Alfred Vincent Kidder Award*, a bronze medallion bearing the likeness of Kidder, was established in 1950 as a tribute to the leadership of A V Kidder by the American Anthropological Association. It has been awarded every three years for eminence in American archaeology, particularly in those fields in which Kidder contributed so much, the Southwestern United States and Middle America.

The awardees have been:

- 1950 Alfred Marston Tozzer
- 1953 Earl Halstead Morris
- 1956 Samuel Kirkland Lothrop
- 1959 Charles Corradino Di Peso
- 1962 Tatiana Proskouriakoff
- 1965 Neil Merton Judd
- 1968 Paul Sidney Martin
- 1971 Richard Stockton MacNeish
- 1974 Gordon Randolph Willey
- 1977 Emil Walter Haury

- 1980 William Timothy Sanders
- 1983 Samuel Watson Smith
- 1986 Ignacio Bernal

The *Distinguished Service Award* of the Society for American Archaeology was established in 1975. In 1980 it was decided to make the award annually. It consists of a framed inscribed citation.

The awardees have been:

- 1975 Carl Haley Chapman
Charles Robert McGimsey III
- 1980 Gordon Randolph Willey
- 1981 Albert Clanton Spaulding
- 1982 Jesse David Jennings
- 1983 Hannah Marie Wormington
- 1984 James Bennett Griffin
- 1985 Emil Walter Haury
- 1986 Waldo R Wedel
- 1987 William A Ritchie
- 1988 Richard B Woodbury and Nathalie F S Woodbury

The Fryxell Award for Interdisciplinary Research was set up by the Society for American Archaeology in 1977 in memory of Roald Fryxell whose career exemplified so well the crucial role of interdisciplinary cooperation in archaeology. The award, consisting of a citation and a medallion, was to be presented annually; however, no award was made in 1984.

The awardees have been:

- 1978 C Vance Haynes
- 1979 Peter J Mehringer
- 1980 James B Griffin
- 1981 Karl W Butzer
- 1982 David A Barreis
- 1983 John E Guilday (posthumously)
- 1984 (No Award)
- 1985 Roger T Saucier
- 1986 Donald K Grayson
- 1987 Richard I Ford
- 1988 David M. Hopkins

The *Crabtree Award* was established by the Society for American Archaeology in 1985 to recognize major contributions to American archaeology by individuals who have had little if any formal training in archaeology and little if any wage or salary as an archaeologist. The award is named after Don Crabtree of Twin Falls, Idaho, who made significant contributions to the study of lithic technology and whose dedication to archaeology was a lifelong personal and financial commitment.

The awards have been:

- 1985 Clarence H. Webb, MD
- 1987 Leonard W Blake
- 1988 Julian Dodge Hayden

BUSINESS & SOCIAL EVENTS

MONDAY, APRIL 3

9:00 AM NSF Archaeology Panel—**Room 438**

TUESDAY, APRIL 4

8:00 AM US Forest Service—**State Room**

9:00 AM Soil Conservation Service—**Club Room**

9:00 AM NSF Archaeology Panel—**Room 438**

WEDNESDAY, APRIL 5

8:00 AM SAA Executive Committee—**Embassy Room**

8:00 AM SAA Government Affairs Committee—**Fayette Room**

8:00 AM Army Corps of Engineers—**Club Room**

8:00 AM US Forest Service—**State Room**

8:00 AM Association of Transportation Archeologists—**Council Room**

8:00 AM American Society for Conservation Archaeology—**Board/Directors Room**

9:00 AM National Association of State Archeologists—**Cabinet Room**

9:00 AM Soil Conservation Service—**Room 436**

2:00 PM Volunteer Workers Meeting—**Fayette Room**

5:00 PM SAA Anti-Looting Committee—**Thomas Jefferson Room**

7:00 PM DOD Meeting—**Club Room**

8:00 PM Student and New Member Reception—**Crystal Ballroom E & F**

THURSDAY, APRIL 6

8:00 AM SAA Committee on Public Archaeology—**State Room**

8:00 AM Archeology Unit of the American Anthropological Association—**Cabinet Room**

8:00 AM SAA Finance Committee—**Council Room**

9:00 AM Society of Professional Archeologists—Executive Committee Meeting—**Club Room**

11:30 AM Council of Presidents Luncheon (By invitation only)—**John Adams Room**

12 Noon Society of Professional Archeologists—Business Committee Meeting—**Club Room**

12 Noon Society for Archaeological Sciences—**Council Room**

12 Noon American Society for Conservation Archaeology—Annual Business Meeting—**State Room**

1:00 PM Society of Professional Archeologists—Executive Committee Meeting—**Club Room**

2:00 PM Council of Affiliated Societies—leaders of State and local archaeological societies are invited to an open discussion of the proposed formation of a Council of Affiliated Societies—**Room 436**

2:00 PM American Society for Conservation Archaeology—Executive Committee Meeting—**State Room**

5:00 PM Society for Archaeological Sciences—Business Meeting—**Cabinet Room**

5:30 PM Reception—Cash Bar—**Grand Ballroom West**

FRIDAY, APRIL 7

2:00 PM Open Forum—an informal question and answer period on SAA Management and organizational changes—**Milan Room**

5:30 PM SAA Annual Business Meeting—**Grand Salon West**

SATURDAY, APRIL 8

8:00 AM SAA Executive Committee Meeting—**Embassy Room**

8:00 AM International Radiocarbon Data Base—**Room 436**

8:00 PM Women in Archaeology: Reception. Cash Bar—**Douglas Room**

9:00 PM Dance Concert—**International Rooms**

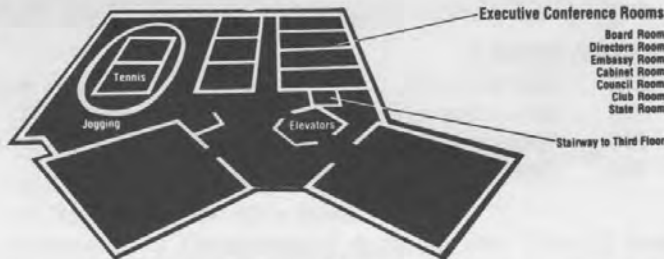
HOTEL FLOOR PLAN

ROOFTOP

(Take express scenic elevators from Main Lobby)



FOURTH FLOOR



Executive Conference Rooms

Board Room
Directors Room
Embassy Room
Cabinet Room
Council Room
Club Room
State Room

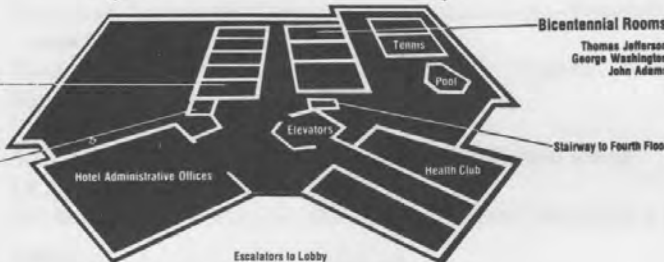
Stairway to Third Floor

THIRD FLOOR

International Ballrooms

Vienna
Strasbourg
Milan
London
Dusseldorf

Stairway to Second Floor



Bicentennial Rooms

Thomas Jefferson
George Washington
John Adams

Stairway to Fourth Floor

SECOND FLOOR

Stairway to First Floor
Stairway to Third Floor

North Wing Meeting Rooms

Fulton
Cobb
Clayton
Gwinnett
DeKalb
Paulding
Douglas

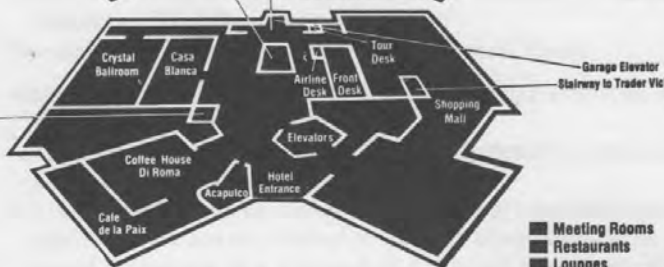


South Wing Meeting Rooms

Fayette
Newton
Rockdale
Forsyth
Henry
Charlote
Walton

LOBBY

Stairway to Second Floor



Garage Elevator

Stairway to Trader Vic's

■ Meeting Rooms
■ Restaurants
■ Lounges
■ Recreational Facility

LOWER LEVEL

Hilton Exhibit Center
Trader Vic's Restaurant and Lounge

PROGRAM

THURSDAY MORNING APRIL 6, 1989

[0] Poster Session: CURRENT ARCHAEOLOGICAL RESEARCH ON DISPLAY

PREFUNCTION WEST

Participants

- Nancy Malville, Human Modification of Skeletal Material from Two Mass Burials at Yellow Jacket, Southwestern Colorado
G. Lain Ellis and Michael R. Waters, The Geoarchaeology of Place: An Example from the Tucson Basin, Arizona
Marne Ausec and Patricia A. Urban, Differential Distributions of Design Elements of Late Classic Painted and Incised Pottery from the Naco Valley, Northwestern Honduras
Sonya Kane and Patricia A. Urban, Form and Structure at a Terminal Postclassic Site in Northwestern Honduras
Suzanne Fish, Paul R. Fish, Curtiss Brennan and John Madsen, Integration and Structure of a Nonriverine Hohokam Classic Period Community
John Weymouth, Why Not Use a Gradiometer?: On the Use of Magnetic Survey Data Obtained at Two Sensor Heights
James Sheehy, Statistical Correspondence between Ceramic Wasters and Total Ceramic Production in a Contemporary Pottery Workshop in Teotihuacan, Mexico
Jane Stone, Laurie J. Reinhart, J. Denbigh Starkey and Ray S. Babcock, Computerized Three-Dimensional Modeling of Stratigraphy: Advantages, Pitfalls, and Data Requirements
Frank W. Eddy and Dale Lightfoot, Remote Sensing of Glaze Period Towns in the Galisteo Basin, Northern New Mexico

[1] Symposium: COLUMBIAN CONSEQUENCES, PART I: THE ENTRADA INTO THE AMERICAN SOUTHEAST

GRAND SALON E

Organizer: David Hurst Thomas

Organizer and Chairperson: Jeffrey M. Mitchem

Participants

- 7:40 Ann Ramenofsky, Loss of Innocence: Assessing Archaeological Explanations of Aboriginal Change in the Sixteenth-Century Southeast
8:00 Jeffrey M. Mitchem, Initial Spanish/Indian Contact in West Peninsular Florida: The Archaeological Evidence
8:20 Dale L. Hutchinson, Postcontact Biocultural Change: Mortuary Site Evidence
8:40 Rochelle A. Marrinan, John F. Scarry and Rhonda L. Majors, Prelude to De Soto: The Panfilo De Narvaez Expedition
9:00 Charles Ewen, Soldier of Fortune: Hernando de Soto in the Territory of the Apalachee, 1539-1540
9:20 John F. Scarry, Beyond Apalachee Province: Assessing the Evidence for Early European-Indian Contact in Northwest Florida
9:40 David J. Hally, Marvin T. Smith and James B. Langford, Jr., The Archaeological Reality of de Soto's Coosa
10:00 James B. Langford, Jr., The Coosawattee Plate: A Catholic/Aztec Artifact from Northwest Georgia
10:20 Charles Hudson, John Worth and Chester DePratter, Refinements in De Soto's Route Through Georgia and South Carolina
10:40 Janet E. Levy, J. Alan May and David G. Moore, From Ysa to Joara: Cultural Diversity in the 15th and 16th Century Catawba Valley
11:00 Caleb Curren and Keith J. Little, Conquest Archaeology of the Alabama Coastal Plain
11:20 David Dye, Warfare in the Sixteenth Century Southeast: The De Soto Expedition in the Interior
11:40 Dan F. Morse and Phyllis A. Morse, The Spanish Discovery and Exploration of "Akansa"

[2] Symposium: MIDDLE PALEOLITHIC ADAPTATIONS IN EURASIA: REGIONAL PERSPECTIVES

ROCKDALE-FORSYTH

Organizers and Chairpersons: Harold L. Dibble and Paul A. Mellars

Participants

- 8:30 Gerhard Bosinski, Middle Paleolithic Settlement Patterns in Western Germany
 8:50 V. Cabrera Valdes and F. Bernaldo de Quiros, Approaches to the Middle Paleolithic in Northern Spain
 9:10 Andre Debenath, The Place of the Mousterian from Charente in the Middle Paleolithic of Southwest France
 9:30 L. G. Freeman, Mousterian Facies: Implications of Morin Level 16
 9:50 Donald O. Henry, Transhumance During the Late Levantine Mousterian
 10:10 Henri Laville, Recent Developments in the Stratigraphy and Paleoenvironmental Context of Middle Paleolithic Occupations in the Circum-Mediterranean
 10:30 Anthony Marks, Typological Variability in the Early Levantine Mousterian: Its Nature and Significance
 10:50 Paul A. Mellars, Industrial Variability in the Southwest French Mousterian: New Perspectives on an Old Debate
 11:10 Alain Tuffreau, Middle Paleolithic Settlement in Northern France

[3] Symposium: REGIONAL PERSPECTIVES IN SOUTHEAST ASIAN ARCHAEOLOGY

VIENNA-STRASBOURG

Organizer and Chairperson: Joyce C. White

Participants

- 8:30 Geoffrey G. Pope, The Lower Paleolithic of Southeast Asia: Toward the Development of Bio-Cultural Models
 8:50 Joyce C. White, Settlement Patterns of Ban Chiang Tradition Sites in Relation to Natural Resources: An Ethnoecological Contribution
 9:10 James S. Penny, Jr., Cultural Development in Mainland Southeast Asia: Models and Data
 9:30 William Glanzman, Joyce C. White and Ann Rufo, Potting Traditions and Their Role in Interpreting Regionalism in Northeast Thailand: The Evidence from Ban Chiang
 9:50 Roberto Ciarla, Andrew D. Weiss and Mauro Cremaschi, Development of Social Complexity in Central Thailand: Community Growth and Change at Ban Tha Kae
 10:10 Vincent Pigott, Investigating the Origins of Metal Use in Prehistoric Thailand
 10:30 Robert E. Murovchick, From the Ground Up: Ore Distribution and Subregional Variability in the Bronze Age of Southwest China
 10:50 P. Bion Griffin, Rethinking Philippine Prehistory
 11:10 Eusebio Z. Dizon, Is There an Iron Age in the Philippines?
 11:30 Discussant: Michael W. Graves

[4] Symposium: HOUSEHOLD DIFFERENTIATION: CASES FROM THE MESOAMERICAN LOWLANDS

NORTH WING EAST

Organizers and Chairpersons: Anabel Ford and Patricia McAnany

Participants

- 8:00 William R. Fowler, Household Differentiation and the Production of Wealth: The Case of 16th-Century Izalco, El Salvador
 8:20 Janine Gasco, Documentary and Archaeological Evidence for Household Differentiation in Colonial Soconusco, New Spain
 8:40 Muriel Alejandro Martinez, Late Formative Household Middens at Don Martin, Chiapas, Mexico
 9:00 Barbara A. Hall and Barbara L. Stark, Ceramics and Social Differentiation Amongst Prehistoric Households in La Mixtequilla, Veracruz, Mexico
 9:20 Thomas W. Killion, Household Differentiation at Middle Classic Maticapan
 9:40 Philip J. Arnold, The Implications of Spatial Availability for Household Refuse Disposal in the Tuxtlas

- 10:00 Michael P. Smyth, The Spatial Organization of Household Storage Behavior: An Ethnoarchaeological View from the Puuc Region of Yucatan
 10:20 Kelli Carmean, Vessel Form, Structure Function, and Social Organization at Sayil, Yucatan, Mexico
 10:40 Patricia McAnany, Economic Stratification Among Agricultural Households in Prehistoric Maya Society
 11:00 Gair Tourtellot, Measures of Household Differentiation at Seibal
 11:20 Discussants: Timothy K. Earle, Barbara L. Stark and Linda Manzanilla

[5] Symposium: THE WOODLAND PERIOD IN THE OHIO VALLEY: A COMPARISON OF CULTURAL DEVELOPMENT IN PRIMARY AND SECONDARY DRAINAGES

NORTH WING WEST

Organizers and Chairpersons: Robert F. Maslowski and Mark F. Seeman

Participants

- 8:20 Robert F. Maslowski and Mark F. Seeman, Woodland Archaeology in the Mid-Ohio Valley: Setting Parameters for Ohio Main Stem and Tributary Comparisons
 8:40 R. Berle Clay, Changing Adena Mortuary Practices
 9:00 Elliot Abrams, Early Woodland Settlement Patterns in the Hocking River Valley, Ohio
 9:20 Charles M. Niquette, Early/Middle Woodland Settlement Patterns in the Ohio Valley
 9:40 Steven R. Ahler, The Hansen Site (15GP14): A Middle/Late Woodland Site Near the Confluence of the Ohio and Scioto Rivers
 10:00 William S. Dancy, Village Origins in Central Ohio: The Results and Implications of Recent Middle and Late Woodland Research
 10:20 Richard W. Jefferies and Michael J. Short, Late Woodland Economy and Settlement in the Mid-Ohio Valley: Recent Results from the Childers/Woods Project
 10:40 Mark F. Seeman, The Intrusive Mound Culture of Southern Ohio and the Bow and Arrow Problem
 11:00 Dee Ann Wymer, Trends and Disparities: The Woodland Paleoethnobotanical Record of the Mid-Ohio Valley
 11:20 Discussants: Patrick J. Munson and James A. Brown

[6] Symposium: THE EVOLUTION OF DOMESTIC ARCHITECTURE IN THE SOUTH CENTRAL ANDES

FAYETTE-NEWTON

Organizer and Chairperson: Mark S. Aldenderfer

Participants

- 9:00 Mark S. Aldenderfer, Archaic Period Domestic Architecture from the Osmore Basin
 9:20 Paul Goldstein, Town Plan and Domestic Function in a Tiwanaku Provincial Center: The Case from Omo, Southern Peru
 9:40 Don S. Rice, Domestic Architecture and Site Structure at El Yaral, Southern Peru
 10:00 Charles Stanish, Domestic Architecture at Pukara Juli, a Lupaka Period Site in the Titicaca Basin
 10:20 Geoffrey W. Conrad, Domestic Architecture of the Estuquina Phase: Estuquina and San Antonio
 10:40 Karen Wise, Late Intermediate Period Domestic Architecture of Lukurmata
 11:00 Prudence M. Rice, Peter Burgi, Mary Van Buren and Geoffrey W. Conrad, Torata Alta, an Inka-Spanish Settlement
 11:20 Discussants: Michael Moseley and Mario A. Rivera

[7] Symposium: EXCAVATING SHELL-BEARING SITES

LISBON

Organizer and Chairperson: Cheryl Claassen

Participants

- 8:00 Julie K. Stein, What Makes a Shell Midden?
 8:20 Kim Kornbacher, A Methodological Stride in Shell Midden Archaeology
 8:40 Jon M. Erlandson, On Reconstructing Diets from California Shell Middens

- 9:00 Barbara Voorhies and George H. Michaels; Periodicity in the Formation Processes of the Shell Middens of the Coastal Chiapas Archaic
- 9:20 Joseph Mountjoy; Macro and Micro Screen Sampling of a Middle Formative Shell Midden at San Blas, Nayarit (Mexico)
- 9:40 David Sanger; Where Did the Indians Go? Seasonality Issues on the Maine Coast
- 10:00 Francis P. McManamon; The Spatial Diversity of Remains in Prehistoric Shell Middens
- 10:20 J. Alan May; Archaeological Shell Middens: Field Experience with Site Formation Models
- 10:40 Randolph Widmer; Archaeological Research Strategies in the Investigation of Shell-Bearing Sites, a Florida Perspective
- 11:00 Nancy Marie White; Testing Remote Shell Middens in the Apalachicola Valley Estuary, Northwest Florida
- 11:20 Cheryl Claassen; The Interpretive Crisis in Shell Midden Archaeology

[8] General Session: ETHNOARCHAEOLOGY

DUSSELDORF

Chairperson: Jean Hudson

Participants

- 8:30 Steve A. Tomka; The Ethnoarchaeology of Site Abandonment in an Agro-Pastoral Context
- 8:50 Raymond Mauldin and Steve A. Tomka; An Ethnoarchaeological Assessment of Grinding Efficiency and Ground Stone Size
- 9:10 Tom D. Dillehay; Use and Discard of Utilitarian and Non-Utilitarian Goods in Large Scale Public Ceremony: An Ethnoarchaeological Perspective from the Mapuche of Chile
- 9:30 Robert J. Hard and William Merrill; Mobility and Sedentism Among the Tarahumara
- 9:50 John Fisher, Jr.; Links in the Lives of Hunter-Gatherers: Archaeological Implications Among Efe Pygmies
- 10:10 Daniel Amick; Assemblage and Feature Diversity Among the !Kung: Implications for Archaeological Studies of Forager Settlement Systems
- 10:30 Susan Kent; Demography of Newly Sedentary Foragers and Implications for Archaeology
- 10:50 Steven Brandt; An Ethnoarchaeological Study of Farmer, Pastoral and Hunter Pottery Use and Mobility Patterns in Southern Somalia
- 11:10 Massimo Vidale; The Identity of Craft Production in Early Urban Societies and the Culturally Specific Definition of Public Space

THURSDAY AFTERNOON APRIL 6, 1989

[9] Symposium: EUROPE IN THE FOURTH MILLENNIUM

MILAN

Organizer: Haskel Greenfield

Organizer and Chairperson: Susan A. Gregg

Participants

- 1:00 Alexandra Kalogirou; The Fourth Millennium in the Aegean
- 1:20 Haskel Greenfield; The Socio-Economic Transformation of Southeastern Europe in the Fourth Millennium
- 1:40 Susan A. Gregg; The "Secondary Colonization" of Europe: The Alpine Foreland in the Fourth Millennium
- 2:00 Peter Bogucki; The Neolithic Mosaic on the North European Plain, 4,000-3,000 B.C.
- 2:20 David Anthony; From Ethnicity to Ecology: The Transformation of Boundaries in the Copper Age of the Southwestern USSR
- 3:10 Juan Vicent-Garcia; Social and Economic Change in Fourth Millennium Iberia
- 3:30 Stanton Green and Marek Zvelebil; Farming an Island: The Development of Agricultural Society in Prehistoric Ireland
- 3:50 Peter Rowley-Conwy; The Danish-South Swedish Coastal Region in the Fourth Millennium B.C.
- 4:10 Michael Ilett; Forager-Farmer Interaction in the Neolithic of Northern France

[10] Symposium: SOUTH ASIAN ARCHAEOLOGY: RECENT RESEARCH AND NEW THEORETICAL PERSPECTIVES

LISBON

Organizer and Chairperson: Carla M. Sinopoli

Participants

- 1:00 William A. McCormack; The Emergence of Long Distance Stone Procurement Systems in Stone Age India
- 1:20 Gurcharan Khanna; Lithic Procurement and Mobility in the Mesolithic of Rajasthan
- 1:40 George F. Dales; The Harappa Project and the Question of Early States
- 2:00 J. Mark Kenoyer; Harappan Craft Specialization and the Question of Urban Segregation and Stratification
- 2:20 Gregory L. Possehl; Regionalism and the Harappan Civilization
- 2:40 Louis Flam; The Sind Archaeological Project: The Kirthar Surveys and Ghazi Shah Excavations
- 3:00 Steven Weber; Accounting for Variability in the Temporal and Spatial Distribution and Occurrences of Plant Remains in South Asia Sites During the Second and Third Millennium B.C.
- 3:20 Jim G. Shaffer; The Early South Asian State: A Non-Traditional Model
- 3:40 Kathleen Morrison; Urban Agricultural Production in South India
- 4:00 John M. Fritz; Imperial Style and Symbolism of Power: A South Indian Example
- 4:20 Carla M. Sinopoli; The Political Economy of a South Indian Empire
- 4:40 Discussant: Jeffrey R. Parsons

[11] Symposium: CHANGING VIEWS OF CLASSIC MAYA POLITICAL ORGANIZATION

NORTH WING WEST

Organizers: Arthur Demarest and Stephen Houston

Chairperson: Don S. Rice

Participants

- 1:00 Robert Sharer; Preclassic Foundations of Classic Maya Political Systems
- 1:20 Arthur Demarest and Stephen Houston; The Dynamism and Heterogeneity of Ancient Maya States
- 1:40 Richard E.W. Adams; Classic Maya Political Units as Viewed from Rio Azul
- 2:00 William Fash, Jr.; Politics, Patronage and Polity in the Evolution of Dynastic Power at Copan, Honduras
- 2:20 Juan Pedro Laporte and Vilma Fialko; Specific Architectural Complexes and Territorial Definition in the Central Maya Lowlands
- 2:40 David Stuart; Thoughts on Territorial Organization Within Classic Maya States
- 3:00 Joseph W. Ball and Jennifer T. Taschek; Small Site Archaeology and Classic Political Organization: The Mopan-Macal Triangle Project
- 3:20 Richard M. Leventhal and Peter S. Dunham; A Regional Model of Political Organization in the Maya Lowlands: An Example from Southern Belize
- 3:40 George J. Bey III and William M. Ringle; The Processes of Political Integration: The Case of Ek Balam, Yucatan
- 4:00 Nicholas Dunning; The Geography of Power in the Terminal Classic, Northern Puuc, Mexico
- 4:20 David Freidel and Linda Schele; Tlaloc War and the Triumph of the Confederacy at Chichen Itza
- 4:40 Discussants: Norman Hammond and David L. Webster

[12] General Session: THE NORTHERN SOUTHWEST

VIENNA-STRASBOURG

Chairperson: Alan Sullivan

Participants

- 1:00 Shirley Powell; Archaeological Survey Data: How Consistent Are We in Recording Them?
- 1:20 Thomas Rocek; Sample Size and Seasonality: Comparisons of Artifact Assemblage Composition

- 1:40 Alan Sullivan and Christian E Downum, Regional Implications of Wupatki Settlement Patterns
- 2:00 Cathy J. Lebo, Settlement Continuity and Adaptive Resilience in the Northern Southwest
- 2:20 Ronald L. Bishop, Suzanne P. De Atley, Veletta Canouts and Alfred Qoyawayma, Modeling Yellow Ware Exchange in the "Jeddito Alliance"
- 2:40 Sarah Schlanger, Recovery Contexts and Systemic Function of Ground Stone Artifacts in Anasazi Settlement Systems
- 3:00 Timothy A. Kohler, Field Houses and the Tragedy of the Commons in the North American Southwest
- 3:20 William Lipe, Bruce Bradley, Mark Varien and Michael Adler, Thirteenth Century Anasazi Community Organization in Southwestern Colorado: The Sand Canyon Archaeological Project
- 3:40 Paul Minnis, Changes in Prehistoric-Historic Food Patterns in the Southwest
- 4:00 Signa Larralde and Phillip Shelley, T'chamahias: The Manufacture, Use, Discard, and Subsequent Curation of a Prehistoric Implement

[13] General Session: LITHIC STUDIES

FAYETTE-NEWTON

Chairperson: Douglas B. Bamforth

Participants

- 1:00 C. Michael Barton, Deborah I. Olszewski and Nancy R. Coinman, Burins: Tool or Technique?
- 1:20 Douglas B. Bamforth, Stone Tools as Stone Tools: The Importance of Utilitarian Considerations in Lithic Analysis
- 1:40 Robert Jeske, The Effects of Time and Energy on Lithic Technology: An Upper Mississippian Example
- 2:00 Christopher Pierce, Functional Analysis of Fire-Altered Rocks

[14] General Session: CERAMIC STUDIES

DUSSELDORF

Chairperson: Anne I. Woosley

Participants

- 1:00 Christopher Carr, Ceramic Temper Characterization with Radiography and Petrography
- 1:20 Anne I. Woosley and Bart Olinger, The Casas Grande Ceramic Tradition: Production and Interregional Exchange of Ramos Polychrome
- 1:40 Arleyn W. Simon, Village Self-Sufficiency in Ceramic Production: A Central Arizona Case
- 2:00 Rebecca Procter-Weiss, Design Structure in the Ceramics of Pot Creek Pueblo
- 2:10 Owen Lindauer, Understanding Stylistic Diversity of Painted Ceramic Designs: An Investigation of Hohokam Red-on-Buff Vessels
- 2:30 Evelyn C. Rattray, The Tepexi Thin Orange Project

[15] Symposium: ZOOARCHAEOLOGY IN THE POST-PROCESSUAL AGE: IS THERE A PLACE?

DUSSELDORF

Organizers and Chairpersons: Brian Hesse and Elizabeth J. Reitz

Participants

- 3:10 Brian Hesse and Paula Wapnish, The Animal World of Ancient Canaan: Zoo-ideology and Zoo-politics
- 3:30 Barbara Ruff, Faunal Remains from a Jewish Household, Old Washington, Arkansas
- 3:50 Allan S. Gilbert, The Cattle of Meketre: Models for Model Building
- 4:10 Daniel H. Sandweiss, Ethnohistoric and Archaeological Rewards for the Fishermen of Chincha, Peru
- 4:30 Jonathon C. Driver, Scales of Analysis in Zooarchaeology
- 4:50 Elizabeth J. Reitz, Testing the Documents: A Case from Nineteenth Century Charleston

[16] Symposium: THE ARCHAEOLOGY OF GARDEN AND FIELD

FAYETTE-NEWTON

Organizers and Chairpersons: Naomi F. Miller and Kathryn Gleason

Participants

- 2:40 Kathryn Gleason, Garden Excavations at the Herodian Winter Palace, Jericho
- 3:10 Geoffrey C. Mees, S. Ford, M. Bowden and V. Gaffney, The Date of "Celtic" Field Systems on the Berkshire Downs, England
- 3:30 Clark L. Erickson, Methodological Considerations in the Study of Ancient Andean Field Systems
- 3:50 William Fisher and Richard Fisher, Cows, Chips, Reefs, and Phytoliths: The Archaeology of Pasture and Range
- 4:10 Anne Yentsch and Conrad M. Goodwin, Defining Morven's Archaeological Garden Landscape
- 4:30 Mary C. Beaudry, The Spencer-Pierce-Little House and Lands in Time and Mind
- 4:50 Lydia Mihelic Pulsipher, Geographic Field Methods for Assessing Locations, Techniques, Crops, and the Ideational Role of Slave Gardens in the Caribbean

[17] Symposium: THREE-DIMENSIONAL ARCHAEOLOGY: FINALLY A FRONTIER!

ROCKDALE-FORSYTH

Organizers and Chairpersons: Kris H. Wilhelmsen and Todd A. Koetje

Participants

- 1:00 Patrick McCutcheon, Techniques for Investigating Horizontal and Vertical Dimensions of Archaeological Deposits: An Historical Review
- 1:20 Kenneth C. Reid and James D. Gallison, Archaeological Depth Perception in Two North Pacific Rainforests
- 1:40 Joseph Schuldenrein, Soil Phosphate "Prints" and the Detection of Activity Loci at Prehistoric Sites
- 2:00 Jan F. Simek and Robert C. Dunnell, Artifact Density, Sherd Size and Plowzone Processes at Robards Farm (Dunklin County, Missouri)
- 2:20 Linda T. Grimm, Site Structure and Formation Processes in the Upper Paleolithic at Solvieux: Evidence from Lithic Refitting
- 2:40 Todd A. Koetje, Spatial Analysis at Le Flageolet II (Dordogne): A Preliminary Look at Three Dimensional Patterning
- 3:00 Michael Petraglia, Spatial Analytic Techniques and Site Formation Processes at the Abri Dufaure, Southwest France
- 3:20 David T. Nash, Spatial Patterning and Site Formation Processes at Haystack Cave
- 3:40 Paul E. Buck, Formation Processes of Old Kingdom Deposits at Kom el-Hisn, Egypt
- 4:00 Kris H. Wilhelmsen, Spatial Analysis and Formation Processes: Problems with the Current Affair
- 4:20 Discussants: Keith W. Kintigh and Jean-Philippe Rigaud

[18] Symposium: WOMEN AND PRODUCTION IN PREHISTORY

NORTH WING EAST

Organizer: Joan Gero

Organizer and Chairperson: Margaret Conkey

Participants

- 1:00 M. Alison Wylie, Gender Theory and the Archaeological Record: Why Is There No Archaeology of Gender?
- 1:20 Joan Gero, Women and Stone Tools
- 1:40 Thomas L. Jackson, Women's Production as Social and Economic Focus
- 2:00 Ruth Tringham, Households with Faces: The Problem of Gender in the Prehistoric Architectural Record
- 2:20 Mary Kennedy and Patty Jo Watson, The Development of Horticulture in the Eastern Woodlands of North America: Women's Role
- 2:40 Christine A. Hastorf, Food and Gender in Prehistory
- 3:00 Susan Pollock, Women in a Men's World: Images of Sumerian Women

- 3:20 Elizabeth M. Brumfiel, Weaving and Cooking: Women's Production in Aztec Mexico
 3:40 Discussants: Thomas Patterson and Linda Cordell

**[19] Symposium: RETHINKING THE TERMINAL ARCHAIC-WOODLAND PERIOD
 TRANSITION IN THE NORTHEAST**

GRAND SALON E

Organizer: James B. Peterson

Organizer and Chairperson: Joseph E. Granger

Participants

- 1:00 William A. Lovis, Variation in Late Archaic Resource Availability as a Consequence of Lake Level Periodicity in the Huron Basin
 1:15 David M. Stothers and Timothy J. Abel, Late Archaic-Early Woodland Band Societies and the Williams Mortuary Complex of the Western Lake Erie Region
 1:30 Marjory Power, The Isle La Motte Site: A Revisionist's Look at Glacial Kame
 1:45 Robert L. Blakely and Richard Woodworth, Sociocultural Implications of Mortuary Patterns and Paleopathology at a Glacial Kame Site in Vermont
 2:00 Joseph E. Granger, Culture, Continuity and Cuylerville: An Inquiry into the Archaic-Woodland Interface in the Genesee River Valley of Central New York
 2:15 John Pfeiffer, Late Archaic-Early Woodland in Southern New England: A Case of Cultural Continuity
 2:30 Lucianne Lavin, Immigration and Innovation: The Late Archaic/Woodland Interface in Southern New England and Southern New York
 2:45 Michael Stewart, Prehistoric Exchange Across the Archaic-Woodland Interface in the Middle Atlantic Region
 3:00 Ronald F. Williamson and William A. Fox, Browsing on Meadowood Blades: An Investigation of Regional Exchange and Production Systems
 3:15 Lawrence J. Jackson, Chestnuts in the Fire: Seasonality and Settlement Indicators for the Early Woodland in Ontario
 3:30 William R. Belcher, Prehistoric Fishing Strategies in East Penobscot Bay, Maine: The Knox Site and Sea-Level Rise
 3:45 John Krigbaum, Subsistence and Health in an Early Woodland Skeletal Population from Vermont
 4:00 Michael J. Heckenberger, James B. Petersen and Louise A. Basa, Early Woodland Period Ritual Use of Personal Adornment at the Boucher Site
 4:15 James B. Petersen, Michael J. Heckenberger and Louise A. Basa, Lithic and Ceramic Artifacts from the Boucher Cemetery: A Summary of Internal and External Correlations
 4:30 Stephen Loring, An Early Woodland Cache from Labrador: Perceptions on Ritual and Ceremony in the "Far Northeast"
 4:45 Norman Clermont, What Do You Do When You Are Out of Bounds? An Analysis of Archaic-Woodland Period Boundaries in Quebec
 5:00 Discussant: Jay Custer

THURSDAY EVENING APRIL 6, 1989

**[20] Symposium: ADVICE AND DISSENT: AN EXCHANGE OF VIEWS ABOUT
 ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S**

GRAND BALLROOM EAST

Organizer: Nancy M. Stone

Chairperson: Jeremy A. Sabloff

Participants

- 7:00 Jeremy A. Sabloff, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Lewis R. Binford, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Margaret Conkey, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Robert C. Dunnell, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Ian Hodder, Open Comments About Archaeological Issues Confronting the 1990's

- 7:00 Mark P. Leone, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Colin Renfrew, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Michael B. Schiffer, Open Comments About Archaeological Issues Confronting the 1990's
 7:00 Patty Jo Watson, Open Comments About Archaeological Issues Confronting the 1990's

FRIDAY MORNING APRIL 7, 1989

[21] General Session: RESEARCH REPORTS—LITHIC STUDIES

GRAND BALLROOM A

Chairperson: Paul R. Fish

Participants

- 7:50 Gail Larsen Peterkin, Small Stone Projectile Points in the French Upper Paleolithic
 8:00 James G. Foradas, Sourcing of Flint Using Normative Mineral Compositions and the Scanning Electron Microprobe: An Experimental Study Using Flint Ridge Flint
 8:10 Susan Wurtzburg, Lithic Analyses and Residential Patterns: Sayil, Mexico
 8:20 David J. Mather and Robert G. Thompson, The Dahnke-Reinke Site: Prehistoric Stone Tool Use in the Red River Valley
 8:30 Robert Benson, Lithic Raw Material Frequency: An Insight into the Mobility Patterns of Late Quaternary Hunter-Gatherers in Southern Somalia

**[22] Symposium: COLUMBIAN CONSEQUENCES, PART II: THE IMPACT OF HISPANIC
 COLONIZATION IN THE SOUTHEAST AND CARIBBEAN**

GRAND BALLROOM A

Organizer: David Hurst Thomas

Organizer and Chairperson: Kathleen A. Deagan

Participants

- 9:00 Jose M. Cruxent, La Isabela 1493: First Spanish Colony in the New World
 9:20 Charles Ewen, The Rise and Fall of Puerto Real
 9:40 Manuel Garcia-Arevalo, Taino-Arawak Cultural Responses to Spanish Arrival in Hispaniola
 10:00 Kathleen A. Deagan, Accommodation and Conflict: Process and Impact of Spanish Colonization in Sixteenth Century Florida
 10:20 Eugene Lyon, The Enterprise of Florida
 10:40 Jane Landers, African Presence in Early Spanish Colonization
 11:00 C. Margaret Scarry and Elizabeth J. Reitz, Herbs, Fish, Scum, and Vermin: Subsistence Strategies in Sixteenth Century Spanish Florida
 11:20 Stanley South, From Thermodynamics to a Status Artifact Model

**[23] Symposium: SAA SPECIAL SESSION: OUR VANISHING PAST—THE WILLFUL
 DESTRUCTION OF A NATION'S HERITAGE**

GRAND SALON WEST

Organizer: Kathleen Reinburg

Organizer and Chairperson: W. James Judge

Participants

- 8:30 Honorable Wyche Fowler, Jr., Comments on the Looting of Archaeological Sites
 9:00 Thomas F. King, The Magnitude and Dimensions of the Looting Problem
 9:30 Sherry Herrgott, Protecting the Resources: The Broad Prospective
 10:00 W. James Judge and Elizabeth Bruen, Visual and Verbal Images of Looting
 10:30 Brian M. Fagan, Archaeology, Looting, and the Public
 11:00 Jeremy A. Sabloff, Where to from Here! The Role of the Profession in the Looting Problem
 11:30 Discussants: Bennie C. Keel, Loretta Neumann and Martin McAllister

[24] Symposium: MIDDLE PALEOLITHIC ADAPTATIONS IN EURASIA: TOPICAL OVERVIEWS

VIENNA-STRASBOURG

Organizers and Chairpersons: Paul A. Mellars and Harold L. Dibble

Participants

- 8:00 Amy Campbell; The Significance of Middle Paleolithic Water Wells at Bir Sahara in the Western Desert of Egypt
- 8:20 Philip G. Chase; Middle Paleolithic Subsistence Patterns in Southwest France: The Combined Evidence of Faunal Remains and Lithic Raw Material Sources
- 8:40 Geoffrey A. Clark, John Lindly and Nancy R. Coinman; Continuity or Replacement? Middle and Upper Paleolithic Adaptations in the Levant
- 9:00 Ofer Bar-Yosef and Lilianne Meignen; Levantine Mousterian Variability in the Light of New Dates from Qafzeh and Kebara Cave
- 9:20 Simon Holdaway; Were There Hafted Projectile Points in the Mousterian?
- 9:40 Jean-Michel Geneste; The Development of Raw Material Procurement Activities in Southwestern France
- 10:00 Catherine Farizy; Subsistence and Social Organization of Middle Paleolithic Local Groups
- 10:20 Wil Roebroeks, Jan Kolen and Eelco Rensink; Interassemblage Variability in the Middle Paleolithic: The Raw Material Evidence
- 10:40 Nicholas Rolland and Harold L. Dibble; Middle Paleolithic Assemblage Variability: A Synthesis of Current Arguments
- 11:00 James Sackett; Stone Tools and Mousterian "Protoculture": A Dissenting View
- 11:20 Marcel Otte; The Significance of Industrial Variability in the European Middle Paleolithic
- 11:40 Discussant: Lewis R. Binford

[25] General Session: RESEARCH REPORTS—MEXICO AND BELIZE

LISBON

Chairperson: Clare M. Yarborough

Participants

- 7:40 Mary Hodge; Aztec Production and Exchange of Ceramics: Archaeological Evidence and Ethnohistoric Models
- 7:50 Susan Evans and AnnCorinne Freter; Hydration Analysis of Obsidian from Cihuatepec, an Aztec Period Village in Mexico
- 8:00 Antonio Curet; Specialized Ceramic Production Areas: An Example from La Mixtequilla, Veracruz, Mexico
- 8:10 Anabel Ford and Scott L. Fedick; Programme for Belize: Management of Prehistoric Maya Cultural Resources in a Tropical Forest Preserve
- 8:20 Thomas H. Guderjan, James F. Garber and Lisa Brody; An Initial Report on Chan Chich and Other Sites in Northwestern Belize
- 8:30 James F. Garber; Excavations at the Late Classic Maya Site of Chac Balam on Ambergris Cay, Belize: Results of the 1988 Field Season
- 8:40 Walter R. T. Witschey; Recent Investigations at the Inland Maya Port City of Muyil, Quintana Roo, Mexico
- 8:50 Gary Walters; Maya Ceremonial Caves Project: 1988-1989 Field Seasons
- 9:00 J. Jefferson MacKinnon and Emily M. May; Small-Scale Maya Limemaking in Belize: Ancient and Modern

[26] Symposium: MAYA SUBSISTENCE: ARCHAEOLOGICAL AND ETHNOBIOLOGICAL APPROACHES

LISBON

Organizer and Chairperson: Heather McKillop

Participants

- 9:30 Mary Pohl, Charles Miksicek, J. Jefferson MacKinnon and Fred Wiseman; Preclassic Maya Wetland Fields, Albion Island, Northern Belize
- 9:50 Cathy Crane; The Palynology and Archaeobotany of Cerros, Belize
- 10:10 Javier Caballero; Modern Maya Homegardens
- 10:30 Heather McKillop; Coastal Maya Tree-Cropping at Wild Cane Cay, Belize

- 10:50 Arturo Gomez-Pampa; The Management of Maya Forests
- 11:10 Christine White; Chemical and Trace Element Analyses of Human Bone from Lamanai, Belize
- 11:30 H. Sorayya Carr; Patterns of Exploitation and Exchange of Subsistence Goods in Late Classic-Early Postclassic Yucatan: A Zooarchaeological Perspective

[27] Symposium: NATIONAL FORESTS IN THE SOUTH: CULTURAL RESOURCES AND MANAGEMENT

NORTH WING WEST

Organizers and Chairpersons: Meeks Etchieson and Gary Knudsen

Participants

- 7:40 Marvin C. Meier and Kent A. Schneider; Fifteen Years of CRM in the Southern Region: An Overview
- 8:00 Gary Knudsen; The Many Hats of a Cultural Resource Manager: What Cultural Resource Managers Can Learn From Other Management Programs
- 8:20 Jack T. Wynn; Mississippian Period Archaeology in the Georgia Blue Ridge Mountains
- 8:40 William H. Radisch, Rodney J. Snedeker and Michael A. Harmon; Trends in Archaic Mobility and Site Function in the Appalachian Summit
- 9:00 Kristen J. Gremillion and Cecil R. Ison; Terminal Archaic and Early Woodland Plant Utilization Along the Cumberland Plateau
- 9:20 Meeks Etchieson; Prehistoric Use of Geological Resources in the Ouachita Mountains
- 9:40 Sam Brookes; Prehistoric Exchange in Mississippi 4000 B.C. to A.D. 1500
- 10:00 Discussants: Ann Early and Bennie C. Keel

[28] General Session: PERU I: PRECERAMIC CULTURES

NORTH WING WEST

Chairperson: Shelia Pozorski

Participants

- 10:40 James B. Richardson, III, Jeffrey T. Hsu and Daniel H. Sandweiss; Environmental Dynamics and the Interpretation of Patterning in Preceramic Remains from South Coastal Peru: Uplift and Sea Level
- 11:00 Thomas Pozorski and Shelia Pozorski; Late Preceramic Sociopolitical Organization in the Casma Valley, Peru
- 11:20 Elzbieta Zechenter; Subsistence Changes in Coastal Peru During the Second and Third Millennia B.C.
- 11:40 Jack Rossen; The Nanchoc Culture: Preceramic Horticulturalists of the Upper Zana Valley, Northern Peru

[29] Symposium: CERAMIC PRODUCTION AND DISTRIBUTION: AN INTEGRATED APPROACH

GRAND BALLROOM B

Organizers and Chairpersons: George J. Bey III and Christopher A. Pool

Participants

- 8:00 Dean E. Arnold and Alvaro Nieves; Factors Affecting Ceramic Standardization
- 8:20 Gary Feinman, Stephen Kowalewski, Sherman Banker and Linda Nicholas; Ceramic Production and Distribution in Late Postclassic Oaxaca: Stylistic and Petrographic Perspectives
- 8:40 Kathleen M. Allen; Ceramic Manufacture and Distribution at the Household Level: The Iroquois
- 9:00 Paul Nicholson and Helen Patterson; The Ballas Pottery Project: Ethnoarchaeology in Upper Egypt
- 9:20 Barbara L. Stark; Modeling Ceramic Production in La Mixtequilla, Central Veracruz, Mexico
- 9:40 Christopher A. Pool and Robert S. Santley; Models of Middle Classic Pottery Production and Distribution in the Tuxtla Mountains, Southern Veracruz, Mexico

- 10:00 Karen Chavez; Traditional Pottery Production and Distribution in South Highland Peru: Implications for Archaeology
 10:20 Elizabeth Lyding Will; Production and Distribution of Roman Amphoras
 10:40 Ezra Zubrow; The Archaeological Implications for Ceramics of Formal Production and Distribution Models
 11:00 Discussant: Robert S. Santley

[30] Symposium: ARCHAEOFAUNAS AND SEASONALITY

ROCKDALE-FORSYTH

Organizers and Chairpersons: Gregory Monks and James M. Savelle

Participants

- 8:00 Arthur Spiess; Deer Tooth Sectioning, Eruption, and Seasonality of Deer Hunting in Prehistoric Maine
 8:20 Marvin Kay; Prospects for Archaeological Seasonality Estimates Based on Modern *Odocoileus virginianus* Cementum
 8:40 Gregory Monks; Methods of Analyzing Growth Increments in Bison Teeth
 9:00 Ariane Michelle Burke; Cementum Incremental Study of Equids
 9:20 Douglas Brewer; Chronologies and Paleoenvironments: Incremental Growth Structures of the Nile Perch (*Lates niloticus*)
 9:40 Don Albright; Precision of Seasonality Determination in Ringed Seals (*Phoca hispida*)
 10:00 James M. Savelle and Don Albright; Comparison of Preparation and Examination Techniques in Dental Annuli Analysis
 10:20 Hiroko Koike; Recent Developments in Seasonal Dating Techniques in Japan
 10:40 Richard H. Meadow, Bryan C. Gordon and Michael R. Toplyn; An Approach to the Study of Incremental Structures in Mammals
 11:00 Bryan C. Gordon; Archaeological Tooth and Bone Seasonal Increments: The Need for Standardized Terms and Techniques
 11:20 Discussants: Donald Grayson, R. Lee Lyman and Cheryl Claassen

[31] Symposium: KALINGA ETHNOARCHAEOLOGY

NORTH WING EAST

Organizer and Chairperson: William A. Longacre

Participants

- 9:00 William A. Longacre; Longitudinal Ethnoarchaeology: The Kalinga Project Over 15 Years
 9:20 Miriam Stark; The Regional Exchange System: An Ethnoarchaeological Case Study
 9:40 Masashi Kobayashi; Use-Wear Analysis of Cooking Pots
 10:00 James Skibo; The Kalinga Cooking Pot: An Ethnoarchaeological and Experimental Evaluation of Performance Characteristics
 10:20 Brian Trostel; Intravillage Ceramic Patterning: An Economic Perspective
 10:40 Ramon Silvestre; Basketry Standardization in a Tribal Society
 11:00 Jose Lorde R. Villamor; Kalinga Rice Terraces
 11:20 Discussants: Warren DeBoer and Michael Deal

[32] General Session: PLAINS ARCHAEOLOGY

FAYETTE-NEWTON

Chairperson: Lawrence C. Todd

Participants

- 8:30 Charles A. Reher; Pursuing the Past to Further the Future: Research, Education, and Economic Development at the High Plains Archaeology Project
 8:50 Alytia A. Levendosky, Judith A. Habicht-Mauche and Margaret J. Schoeninger; Testing Models of Antelope Creek Phase Subsistence Using Bone Chemistry Analysis
 9:10 David Meltzer; Altitheal Archaeology on the Southern High Plains
 9:30 Robert Brooks; Planned Versus Unplanned Abandonment of Dwellings: Impacts on the Context of House Floors
 9:50 Donna C. Roper; Economic Change in the Village Period on the Central Plains

- 10:10 Stephan Lensink; Resource Depletion and Inter-Societal Conflict in the Initial Variant of the Middle Missouri Tradition
 10:30 Donald J. Blakeslee and Kim N. Schneider; Prehistoric Social Organization from Dental Enamel Composition: A Preliminary Study
 10:50 Fred Schneider and Michael Michlovic; The Shea Site and the Process of Plains-Woodland Interaction
 11:10 James M. Collins; The Perspicuous Art of Paper Archaeology: A Cautionary Tale
 11:30 Mary Whelan, Randall Withrow and Barbara H. O'Connell; The Black Dog Burial Site, 21-DK-26: Evidence for Culture Change at a 19th Century Dakota Indian Cemetery

FRIDAY AFTERNOON APRIL 7, 1989**[33] Symposium: COPING WITH SITE LOOTING: SOUTHERN PERSPECTIVES**

NORTH WING WEST

Organizers and Chairpersons: Kent A. Schneider and John Ehrenhard

Participants

- 1:00 Rodney J. Snedeker and Michael A. Harmon; Archaeological Vandalism in the Southeastern National Forests
 1:20 Bob Carr; Deterrents to Site Vandalism in Urban Settings: The Miami Example
 1:40 Robert C. Wilson and Thomas Desjean; Vandalism Behavior in the Southeast National Parks-Diagnoses and Treatments
 2:00 Julia (Jill) Elmendorf; A Role for the Amateur Archaeologist: Allies in Decreasing Site Looting
 2:20 Robert M. Thorne; Preservation Is a Use: Sites Can Be Protected
 2:40 John Jameson; Co-Management of Vandalized Sites: Opportunities and Problems
 3:00 Michael Moore; A Review of the Tennessee State Cemetery Law and Its Impact Upon Prehistoric Site Preservation
 3:20 Ray A. Williamson and Fred Blackburn; Approaches to Curbing Vandalism and Pot Hunting of Archaeological Resources
 3:40 Discussant: Kathleen Reinburg

[34] General Session: EUROPEAN ARCHAEOLOGY: LATE QUATERNARY STUDIES

VIENNA-STRASBOURG

Chairperson: Michael A. Jochim

Participants

- 1:00 Berit Valentin Eriksen; Modeling Intersite Settlement Patterns in the Late Paleolithic and Early Mesolithic of Southwest Germany
 1:20 Roger Colten, Daniela B. Burroni, Randolph E. Donahue and Christopher O. Hunt; Paleolithic Research in the Farma Valley, Tuscany, Italy
 1:40 Daniel Evett; Modeling Mesolithic Plant Food Consumption: The Case from Italy
 2:00 Thomas Fletcher; System Scale, Information, and Organizational Change in Tribal Social Systems
 2:20 Margaret Glass; The Horse in Neolithic Central Europe
 2:40 Christopher Polglase; Competing Sources, Resource Availability and Utilization at the End of Long-Distance Obsidian Exchange Routes
 3:00 Gary Shaffer and Sandro Bonardi; Stentinello Rock Features from Calabria, Italy
 3:20 Christopher Hoffman; The Beginnings of Metallurgy in the Western Mediterranean
 3:40 Douglass W. Bailey; Investigating Value Socially in the Prehistory of Northeastern Bulgaria
 4:00 Robert M. Ehrenreich and Massimo Vidale; Metallurgical Workshops: Production in the Foothill Settlements of Northeastern Italy
 4:20 Matthew L. Murray; Iron Age Transformations: Settlement Pattern Analysis and the Changing Socio-Cultural Organization of Space in Southern Germany
 4:40 Gary Webster; Elite Majorities and the Emergence of Stratification in Prehistoric Europe

[35] Symposium: THE EVOLUTION OF COMPLEX SOCIETY IN EARLY AND MIDDLE FORMATIVE MESOAMERICA: NEW EVIDENCE AND INTERPRETATIONS

GRAND BALLROOM A

Organizers and Chairpersons: Mary E. Pye and Michael Love

Participants

- 1:00 Rebecca Gonzalez; Archaeological Investigations at La Venta: 1984-1988
 1:20 Mary E. Pye and Arthur Demarest; The Evolution of Civilization in Southeastern Mesoamerica: New Evidence from El Mesak, Guatemala
 1:40 James T. Myers; New Evidence on the Evolution of Regional Economy on the South Coast of Guatemala
 2:00 Thomas Wake and Justin Hyland; Early Formative Flora, Fauna, and Estuarine Subsistence Systems in South Coastal Guatemala
 2:20 John E. Clark and Michael Blake; The Early Formative Sequence at Chiapas, Mexico
 2:40 Michael Love and Thomas L. Jackson; Middle Formative Exchange in Pacific Guatemala: Sources of Obsidian from La Blanca
 3:00 Ariadne H. Prater; Early Art Styles at Kaminaljuyu
 3:20 Eugenia J. Robinson; Middle Preclassic Populations in the Central Highlands of Guatemala
 3:40 Barbara Arroyo, Arthur Demarest, Paul E. Amaroli and Thomas L. Jackson; The El Carmen Site, El Salvador: New Information on the Early Preclassic of Southeastern Mesoamerica
 4:00 Discussants: David C. Grove and Barbara L. Stark

[36] Symposium: HOUSEHOLDS AND SETTLEMENTS IN THE MISSISSIPPIAN PERIOD

GRAND SALON WEST

Organizers and Chairpersons: J. Daniel Rogers and Bruce D. Smith

Participants

- 1:00 Richard W. Yerkes and John Nass, Jr.; Social Differentiation in Mississippian and Fort Ancient Societies
 1:20 John Kelly; Emergent Mississippian Community and Household Organization in the American Bottom
 1:40 Mark Mehrer and James M. Collins; Household Archaeology at Cahokia and Its Hinterlands
 2:00 Robert H. Lafferty, III and Neal H. Lopinot; Mississippian Household Organization and Subsistence During the Mid-Fourteenth Century, Buffalo National River, Arkansas Ozarks
 2:20 J. Daniel Rogers; Dispersed Communities and Integrated Households: A Perspective from Spiro and the Arkansas Basin
 2:40 Tim S. Mistovich; Toward an Explanation of Variation in Moundville Phase Households in the Black Warrior Valley, Alabama
 3:00 H. Edwin Jackson and Susan L. Scott; Mississippian Homestead-Village Symbiosis: Faunal Exploitation in the Tombigbee Valley
 3:20 Lynne P. Sullivan; Household and Community Organization of the Mouse Creek Phase
 3:40 James W. Hatch; Lamar Period Farmsteads in Piedmont Georgia
 4:00 Mark Williams; Chiefly Compounds
 4:20 John F. Scarry; Apalachee Households: Examining the Basal Social Economic Units of a Mississippian Society
 4:40 Discussant: James A. Brown

[37] General Session: ARCHAEOLOGY IN CALIFORNIA

NORTH WING EAST

Chairperson: James L. Rudolph

Participants

- 1:00 Daniel O. Larson, Joel Michaelsen and Phillip L. Walker; Climatic Variability: A Compounding Factor Causing Culture Change Among Prehistoric Coastal Populations
 1:20 James L. Rudolph; Overexploitation and Size Selection as Explanations of Valve Length in *Mytilus californianus*
 1:40 Leslie L. Hartzell; Buena Vista Lake: Further Investigations into "Lacustrine Adaptations"
 2:00 Mark Q. Sutton; Prehistoric Dietary Preferences in the Salton Basin, California
 2:20 Kent Lightfoot; Archaeology in the Hinterland of Fort Ross, California

[38] Symposium: ETHICS IN PROFESSIONAL ARCHAEOLOGY

NORTH WING EAST

Organizer and Chairperson: J. Ned Woodall

Participants

- 2:50 Mark S. Frankel; The Professional Society Role in Promoting Ethical Conduct
 3:10 Edward B. Jelks; Ethics, Professionalism and Archaeology
 3:30 Stephen Claggett; Someone Is Always Going to Be Unhappy with My Decisions: A State Archaeologist's Perspective on Ethics and Public Archaeology
 3:50 Michael A. Glassow; Ethical Issues Brought About by the California Environmental Quality Act
 4:10 Toni Carrell; Ethics Vs. Commercial Exploitation: What's It Worth to the Future?
 4:30 Michael Roberts; Ethics and Archaeology for Profit
 4:50 Discussants: George Rapp, Jr. and Charles E. Cleland

[39] Symposium: ARCHAOMETRY IN ACTION

ROCKDALE-FORSYTH

Organizer and Chairperson: Renee Kra

Participants

- 1:00 Ronald G. V. Hancock; Neutron Activation Analysis: Is it of Any Real Use to Archaeology?
 1:20 Charles P. Swan, Patrick E. McGovern and Stuart J. Fleming; Characterization of Ancient Materials Using PIXE Spectrometry
 1:40 Andrew D. Weiss; On the Edge of CASM: Computer Assisted Surveying and Mapping in the Field
 2:00 Ann Rufo and William Glanzman; Novel Applications of X-Ray Technologies in Archaeology
 2:20 David Hyland, James M. Adevasio, J. M. Tersak and M. I. Siegel; A New Technique for the Identification of Residual Blood on Artifactual Materials
 2:40 Scott Madry; Remote Sensing in Archaeology: A Regional Approach to Non-Destructive Analysis
 3:00 Harold W. Borns; Paleoenvironments from Glacier Ice Cores
 3:20 Malcolm Hughes; Tree Rings as Records of Large-Scale Environmental Events
 3:40 Austin Long, B. F. Benz, D. J. Donahue and A. J. Jull; First Direct AMS Dates on Early Maize from Tehuacan, Mexico
 4:00 Stephen W. Robinson; The Probabilistic Calibration of Radiocarbon Ages
 4:20 Renee Kra; New World Quaternary Vertebrate Localities: The First Pilot Project of the International Radiocarbon Data Base (IRDB)
 4:40 Discussant: Stuart J. Fleming

[40] General Session: PALEOINDIAN STUDIES

GRAND BALLROOM B

Chairperson: Jack L. Hofman

Participants

- 1:00 Dennis B. Blanton and Frankie Snow; Paleoindian and Early Archaic Occupations at the Feronia Locality in South-Central Georgia
 1:20 Jack L. Hofman and Lawrence C. Todd; Reinvestigation of the Lipscomb Bison Kill and Its Significance for Folsom Period Research
 1:40 Mark E. Miller, George C. Frison and Kyle C. Baber; Continuing Investigations at the Finley Paleoindian Site in Sweetwater County, Wyoming
 2:00 Michael R. Waters and Anne I. Woosley; A Geoarchaeological Reevaluation of Early Cochise Culture Artifact Associations with Pleistocene Lake Cochise, Arizona
 2:20 Shirley Jo Barr; Blood From Stones: Blood Residue Analysis of the Dietz Site Clovis Artifacts

[41] Symposium: HUNTER GATHERER MOBILITY, RESOURCE TRANSPORTATION AND STORAGE

GRAND BALLROOM B

Organizer and Chairperson: Kevin T. Jones

Participants

- 3:00 Duncan Metcalfe, A General Cost/Benefit Model of the Tradeoff Between Transport and Field Processing
- 3:20 David B. Madsen; Transportation, Seasonality and Storage Among Mid-Latitude Hunter-Gatherers
- 3:40 James O'Connell; Factors Conditioning the Differential Transport of Animal Body Parts Among Eastern Hadza
- 4:00 Robert G. Elston; Quarry Pits and Biface Caches: Implications for Models of Lithic Procurement and Transportation
- 4:20 Kevin T. Jones and David B. Madsen; Transportation Costs and Diet Choice in the Great Basin
- 4:40 David Rapson and Lawrence C. Todd; Body Size, Season, Sex, and Butchery: Inferences about Storage and Transport through Faunal Analysis
- 5:00 Discussants: Robert L. Kelly and David Hurst Thomas

[42] General Session: PERU II: CERAMIC CULTURES

FAYETTE-NEWTON

Chairperson: Thomas Pozorski

Participants

- 1:00 Charles M. Hastings; Intensified Archaeological Survey in the Central Peruvian Montana
- 1:20 Michael Malpass; Irrigated Versus Non-Irrigated Terraces in the Andes: Evidence for Late Prehistoric Climatic Change
- 1:40 Brian Billman; Land, Water, and Architecture: The Political and Economic Organization of an Early Andean State
- 2:00 Daniel G. Julien; Late Pre-Inca Political Geography of the Cajamarca Region, Peru
- 2:20 Katharina J. Schreiber; Nasca Habitation Sites: Where They Are and What They Look Like
- 2:40 Helaine Silverman; The People Who Made the Nazca Lines: Settlement Patterns in the Ingenio River Valley, Nazca, Peru
- 3:00 Heidi A. Lennstrom; Changing Resource Utilization in Late Prehistoric Peru: An Analysis from Three Puna Sites
- 3:20 J. Lee Hollowell; Reassessment of the Fortaleza, Ollantaytambo, Peru
- 3:40 Brian S. Bauer; Andean Moieties: An Archaeological Prospective
- 4:00 Colin McEwan; The Inca Rite of Capac Huecha: Defining the Sacred and Political Geography of Empire

[43] General Session: ZOOARCHAEOLOGY

LISBON

Chairperson: Stanley Olsen

Participants

- 1:00 Marie Selvaggio and Robert J. Blumenschine; Establishing the Taxon-Specificity of Carnivore Tooth Marks on Bone
- 1:20 Karen D. Lupo; A Comparative Analysis of Carnivore Bone Modification
- 1:40 Darcy F. Morey and Walter E. Klippel; Subsistence Activities of Humans and Canids: Analysis of Deer Bone from a Late Middle Archaic Shell Midden in Middle Tennessee
- 2:00 Dave N. Schmitt and Kenneth E. Juell; On the Identification of Carnivore Scatological Faunal Accumulations in Archaeological Contexts
- 2:20 Alice Emerson; Variability in Bison Carcass Composition and the Construction of Carcass Utility Models for Use in Archaeological Applications
- 2:40 Allen P. McCartney and James M. Savelle; Thule Eskimo Bowhead Whale Selection: A Zooarchaeological Analysis
- 3:00 Barry W. Baker and Brian S. Shaffer; Human Subsistence Based on Vertebrate Faunal Remains Recovered from 41HR273 in Harris County, Texas
- 3:20 David Geddes; Middle Neolithic Cattle Butchering at Villeneuve-Tolosane (France)

- 3:40 Laurie Zimmerman and D. Gentry Steele; Dietary Reconstruction of Hunter-Gatherers of the Eastern Margin of the Tamaulipan Biotic Province
- 4:00 Arlene Fradkin; Cherokee Animal Classifications: Correlates to the Cherokee Zooarchaeological Record
- 4:20 Barry Rolett; The Polynesian Analogy to Pleistocene Faunal Extinctions: New Evidence from the Marquesas Islands

SATURDAY MORNING APRIL 8, 1989**[44] Symposium: COLUMBIAN CONSEQUENCES, PART III: THE MISSIONS OF LA FLORIDA**

GRAND BALLROOM A

Organizer and Chairperson: David Hurst Thomas

Participants

- 8:00 David Hurst Thomas; Missions of the Spanish Borderlands: A Trans-Continental Reflection
- 8:20 John W. Griffin; Changing Perspectives on the Spanish Missions of La Florida
- 8:40 Clark Larsen, Margaret J. Schoeninger, Katherine F. Russell and Dale L. Hutchinson; Beyond Demographic Collapse: Biological Adaptation and Change in Native Populations of La Florida
- 9:00 David J. Weber; Blood of Martyrs; Blood of Indians: Toward a More Balanced View of Spanish Missions in Seventeenth Century North America
- 9:20 Michael V. Gannon; Defense of Indian Rights in the Florida Franciscan Missions
- 9:40 Conrad Harkins, O.F.M.; On Removing Sand from Our Brothers' Graves: The Interest of Modern Franciscans in Uncovering the Traces of the Franciscan Province of Santa Elena
- 10:00 Amy Turner Bushnell; The Sacramental Imperative: The Relationship of Catholic Ritual to Indian Subsistence and Settlement in the Province of Florida
- 10:20 B. Calvin Jones and Gary Shapiro; Nine Mission Sites in Apalachee
- 10:40 John H. Hann and Gary Shapiro; The Documentary Image of the Council Houses of Spanish Florida Tested by Excavations of the Council House at San Luis de Talimali Mission
- 11:00 Rebecca Saunders; Ideal and Innovation: Spanish Mission Architecture in the Southeast
- 11:20 Elizabeth J. Reitz; Zooarchaeological Evidence for Subsistence at La Florida Missions
- 11:40 Donna Ruhl; Spanish Mission Paleoethnobotany: An Overview and Some Speculations on Sixteenth and Seventeenth Century La Florida

[45] Symposium: CORRIDOR STUDIES IN CONTRACT ARCHAEOLOGY

MILAN

Organizer and Chairperson: David J. Rue

Participants

- 9:00 James Cleland; Multi-Stage Research in the Siting and Assessment of Linear Projects
- 9:20 David J. Rue; Intersite Analysis of 20 Lithic Assemblages from a 140 Mile Pipeline Corridor in Southern Indiana
- 9:40 A. E. Rogge, Patrick M. O'Brien and Everett J. Bassett; Going Down That Long Lonesome Corridor
- 10:00 John Haynes; The Dulles Sites: Proposed Highway Corridors Reveal Late Archaic Spatial Organization
- 10:20 Jeanette E. Buehrig; The Grenade Pit Site [12-B-815]: A Significant Multi-Component Site at Atterbury RFTA, Bartholomew County, Indiana
- 10:40 Jeannine Kreinbrink; The Woodward Site: One Piece of a Big Puzzle in Southeast Pennsylvania
- 11:00 Discussant: Deborah Vrabl

[46] Symposium: VILLAGE COMMUNITIES IN EARLY COMPLEX SOCIETIES

GRAND BALLROOM B

Organizers and Chairpersons: Steven E. Falconer and Glenn M. Schwartz

Participants

- 8:00 Bonnie Magness-Gardiner, Urban-Rural Relations in the Second Millennium B.C. Levant: The Textual Evidence
 8:20 Glenn M. Schwartz, Excavations at Tell Raka'i: A Small Rural Site of Early Urban Northern Mesopotamia
 8:40 AnnCorinne Freter, The Role of Rural Settlement Analysis at the Maya Center of Copan, Honduras
 9:00 Nancy Gonlin, Rural Occupation of the Classic Maya at Copan
 9:20 Patricia Wattenmaker, Political Centralization and the Reorganization of Rural Production
 9:40 Gil Stein, Segmentary State and Organizational Variation in Early Complex Societies: A Rural Perspective
 10:00 Thomas R. Hester and Harry J. Shafer, The Ancient Maya Craft Community at Colha, Belize and its External Relationships
 10:20 Eleanor King and Daniel Potter, Small Sites in Prehistoric Maya Socioeconomic Organization: A Perspective from Colha, Belize
 10:40 Robert S. Santley, Urban-Rural Interrelationships at Maticapan, Veracruz, Mexico
 11:00 Ilene M. Nicholas and Elizabeth Henrickson, Functional Analysis of Al-Qesir, an Early Bronze Age Transjordanian Site
 11:20 Steven E. Falconer, Mary C. Metzger and Patricia L. Fall, Early Village Life in the Jordon Valley: A Study of Rural Social and Economic Complexity
 11:40 Discussants: Brian D. Hayden and Carol Kramer

[47] Symposium: APPLICATIONS OF MAMMALIAN MORTALITY DATA FOR THE STUDY OF PREHISTORIC HUMAN PREDATOR ECOLOGY

LISBON

Organizer and Chairperson: Mary C. Stiner

Participants

- 8:00 Robert J. Blumenshine, Evaluating Size and Age Mortality Profiles as Criteria for Distinguishing Hominid Scavenging and Hunting
 8:30 Jean Hudson, Identifying Non-Selective, Small Game Hunting Strategies in the Archaeological Record
 8:50 Gary Haynes, Megamammal Age Profiles: Meaning or Ambiguity?
 9:10 Mary C. Stiner, Mortality Patterns as Indicators of Upper Pleistocene Human Predator Niche: A Comparative Perspective
 9:30 Diane Gifford-Gonzalez, Examining and Refining the Klein Crown Height Method of Age Estimation
 9:50 R. Lee Lyman, Subsistence Change and Pinniped Hunting
 10:10 John D. Speth, Taphonomy and Human Behavior: Problems in Distinguishing Cultural and Non-Cultural Agents
 10:30 Lawrence C. Todd, Seasonality Studies and Paleoindian Subsistence Strategies
 10:50 George C. Frison, Prehistoric High Plains Hunting Strategies Based on Mortality Studies from Faunal Remains in Archaeological Sites and Animal Behavioral Studies

[48] General Session: AUTOMATED METHODS: COMPUTERS AND MECHANICAL DEVICES

DUSSELDORF

Chairperson: Lawrence E. Bradley

Participants

- 7:40 Anne Swearingen DeFrance and Jane Stone, Museum Database: A Relational Database Prototype for Collections Management and Research
 8:00 Ian R. Johnson and Helen S. Clemens, Beyond Registration: Making Site Registers Relevant to CRM
 8:20 Lynne Mackin Wolforth, Computer Simulation of Infectious Disease Diffusion in Protohistoric Populations

- 8:30 Bettina Arnold and Egon Gersbach, The Kartomat: A Field Drawing Machine
 8:50 David Van Horn, Mechanized Archaeology

[49] Symposium: ARCHAEOBOTANY THROUGH PHYTOLITH ANALYSIS

DUSSELDORF

Organizers and Chairpersons: George Rapp, Jr. and Susan Mulholland

Participants

- 9:25 Irwin Rovner, New Methods of Microscopic Imaging and Rapid Image Analysis of Chaotic Microparticle Morphology
 9:45 Dolores Piperno and Deborah M. Pearsall, Some Comments on the Role of Phytolith Analysis in Tropical Paleoethnobotany and Paleoeecology
 10:05 Lawrence Kaplan, Mary B. Smith and Lesley Anne Sneddon, Cereal Grain Phytoliths of the Near East
 10:25 Susan Mulholland, Grass Opal Phytolith Production: A Basis for Archaeological Interpretation in the Northern Plains
 10:45 Elizabeth J. Lawlor, Taphonomy of Phytoliths in the Mohave Desert: A Preliminary Report
 11:05 John Ramsey and Irwin Rovner, Phytolith Extraction from Equid Tooth Cementum
 11:25 Linda Scott Cummings, Diet and Nutritional Stress in Two Ancient Christian Sudanese Nubian Populations: The Coprolite Record
 11:45 John G. Jones, The Extraction and Analysis of Calcium Oxalate Phytoliths from Archaeological Sediments and Coprolites

[50] Symposium: PALEOSHORELINES AND PREHISTORIC SETTLEMENT

NORTH WING EAST

Organizer and Chairperson: Lucy Lewis Johnson

Participants

- 8:00 Margaret Anne Winslow, Modeling Paleoshorelines at Tectonically Active Margins
 8:20 Lucy Lewis Johnson, Paleoshorelines and Prehistoric Settlement on Simeonof and Chernabura Islands, Outer Shumagin Islands, Alaska
 8:40 William W. Fitzhugh and Peter Clark, Beach Ridge Chronology on the Labrador Coast: Archaeological, Geological, and Paleoeecological Results
 9:00 James Dunbar, The Natural Resource Orientation of Clovis and Suwannee Age Paleoindian Sites in Florida with Particular Reference to the Outer Continental Shelf
 9:20 Ervan G. Garrison, Recent Archaeo-Geophysical Studies of Paleoshorelines of the Eastern Gulf of Mexico
 9:40 William F. Keegan, Lucayan Settlement Patterns and Recent Coastal Changes in the Bahamas
 10:00 Jack Donahue and David R. Watters, Barbuda, Lesser Antilles: Shoreline Change Before and During Prehistoric and Historic Occupation
 10:20 Eugene McDougle, Mangroves and Sand Dunes: Changing Economies Along the Changing Prehistoric Shorelines of Southwest Ecuador
 10:40 Michael Moseley, David Wagner and James B. Richardson, III, Space Shuttle Imagery of Shoreline Alteration Processes on the Peruvian Coast
 11:00 Discussants: Melanie J. Stright and Richard H. Jordan

[51] Symposium: CULTURE CHANGE AND VARIABILITY IN THE UPPER PALEOLITHIC

VIENNA-STRASBOURG

Organizers and Chairpersons: Anne Pike Tay, Heidi Knecht and Randall White

Participants

- 8:00 Anna Belfer-Cohen and Ofer Bar-Yosef, Non-Artifact Remains from the Levantine Upper Paleolithic
 8:20 Francis B. Harrold, Functional Lithic Variability in the Upper Paleolithic Perigord
 8:40 Anna Backer and Michel Guilbaud, The Spatial Distribution of Microdebitage in Aurignacian and Castelperronian Levels of St. Cesaire (Charente Maritime)
 9:00 Heidi Knecht, Design Variability in Aurignacian Bone and Antler Projectile Technologies
 9:20 Michel Dewez, Production Strategies of Bone and Antler Technology in Belgium

- 9:40 Joachim Hahn; Interassemblage Variability of the Aurignacian in Central Europe
 10:00 Randall White; Variation and Change in the Structure of Aurignacian Decoration and Body Ornamentation
 10:20 Anne Pike Tay; Changes in Seasonal Exploitation of Red Deer in the Upper Paleolithic of Southwest France
 10:40 James G. Enloe; Faunal Evidence for Subsistence Change in the Upper Paleolithic
 11:00 Discussants: Olga Soffer and Donald Grayson

[52] General Session: ARCHAEOLOGY OF THE SOUTHEASTERN WOODLANDS AND CARIBBEAN

NORTH WING WEST

Chairperson: David Carlson

Participants

- 8:00 Mark J. Lynott and James E. Price; The Late Woodland to Mississippian Transition in the Eastern Ozark Region, Southeast Missouri
 8:20 David William Zeanah; Diet Breadth and the Adoption of Horticulture in the Eastern United States
 8:40 Mark Madsen and Robert C. Dunnell; Role of Microartifacts in Deducing Land Use from Low Density Records in Plowed Surfaces
 9:00 David Carlson; Pattern Recognition and Cultural Stratigraphy: An Example from East Texas
 9:20 Richard Edging and Paul Kreisa; Perspectives on Late Prehistoric Subsistence Economies in the Mid-South
 9:40 Vernon James, Jr. Knight; Mississippian Social Organization
 10:00 Marion F. Smith, Jr. and John F. Scarry; A Disquieting Synthesis of Apalachee Fort Walton: Micro-Scales for Mississippian Research
 10:20 Teresa Rudolph; A Tribal Ceremonial Center in Regional Context
 10:40 Charles L. Hall; Investigating Archaic Settlement in Middle Tennessee
 11:00 Brett Riggs, Norman D. Jefferson and George M. Crothers; Conflict and Stress at Hiwassee Old Town During the American Revolution
 11:20 Nancy Watford Hoffman; Island Adaptation: The Implications of a Spanish Ceramic Assemblage in a Lucayan Site
 11:40 David R. Watters and James B. Petersen; The Fountain Cavern Ceremonial Site, Anguilla, West Indies

[53] General Session: RESEARCH REPORTS—SOUTHWEST

FAYETTE-NEWTON

Chairperson: Christian E. Downum

Participants

- 7:40 Kelly J. Schroeder; Hohokam Mortuary Remains and Village Movement at Pinnacle Peak Village-AZ:U:5:3(ASU)
 7:50 John R. Welch; Archaeology at the Fenster School of Southern Arizona: A Reevaluation of the Sabino Canyon Ruin and Comments on 60 Years of Precollegiate Educational Programs
 8:00 James Woodman; Toward an Understanding of Prehistoric Political Complexity in Central Arizona: An Example from Fourmile Ruin
 8:10 Yasushi Kojo; Autonomous Ceramic Production in the Northern Southwest
 8:20 Edgar Huber; Green Lizard Site: Excavations at a Late Pueblo III Small Habitation
 8:30 Harry J. Shafer; The Swarts Ruin Revisited: An Assessment of the 1920's Excavation and Data Potential
 8:40 Judith A. Habicht-Mauche and Winifred Creamer; Analysis of Room Use at Arroyo Hondo
 8:50 Alison E. Rautman; Agricultural Risk and Subsistence Strategies at the Kite Site, Central New Mexico

[54] General Session: HISTORICAL ARCHAEOLOGY

FAYETTE-NEWTON

Chairperson: John White

Participants

- 9:15 Belinda Blomberg; Scale and Context in Urban Archaeology: Free Black Neighborhood Formation and Preservation
 9:35 Paul Shackel and Barbara J. Little; Historical Anthropology in Annapolis, Maryland: Ongoing Research
 9:55 Mitchell T. Mulholland; Acculturation and Continuity Among Eighteenth Century Native Americans in Southern New England
 10:15 Mark Wagner and Mary R. McCorvie; The "Old Landmark": An Early to Mid-Nineteenth Century Tavern Along the Saint Louis-Vincennes Trace
 10:25 Peter Bleed and Christopher Schoen; Sales Out the Front Door, Rejects Out the Back: Production and Debris at the Lincoln Pottery Works
 10:45 Marcel Kornfeld, Dale L. Wedel, Todd Guenther and Charles A. Reher; Wyoming Territorial Penitentiary: Confined Space, Industrial Production and Behavioral Modification
 11:05 Jeffrey Girard; System Definition and Historic Archaeological Sites Near Taos, New Mexico
 11:25 Margaret Purser; Tales from the Bishop's Bodega: Late Colonial Ceramics from Antigua, Guatemala
 11:45 Stanley Olsen; Tenth Century Lamellar Armor from Tibet

[55] General Session: BIOARCHAEOLOGY AND MORTUARY ANALYSIS

ROCKDALE-FORSYTH

Chairperson: Lynn M. Snyder

Participants

- 9:25 Donna Boyd and C. Clifford Boyd, Jr.; Effects of Subsistence and Technological Change on Masticatory Anatomy Across a Prehistoric Skeletal Sample from Tennessee
 9:45 D. Gentry Steele and Michael R. Waters; Osteological Analysis of Human Skeletal Remains Assigned to the Sulphur Springs Stage of the Cochise Culture (Ca. 8,200-10,400 B.P.)
 9:55 Lynn M. Snyder and P. Willey; Canid Modification of Human Skeletal Remains: A Comparison of Archaeological Materials from Crow Creek
 10:15 Jonathan D. Kent, T. Rose Holdcraft and Makoto Kowta; Aspects of Field Conservation and Analysis of Perishable Remains from a Late Nasca Cemetery in South Coastal Peru
 10:35 Mark Schurr; The Significance of Middle Mississippian Mortuary Treatments: A Statistical and Isotopic Perspective
 10:55 Lane Anderson Beck; Ethnic Boundaries and the Copena Mortuary Complex
 11:15 Darrell Creel; Cremation in Mimbres Mogollon Mortuary Programs
 11:35 Lisa Kealhofer, J. R. Richards and B. J. Baker; Mortuary Ritual and Spatial Patterning: The Northern Cemetery, Abydos, Egypt
 11:55 Dianna Bolt; Neolithic Cemeteries in Southwestern Asia

[56] General Session: SOUTHEASTERN MESOAMERICA AND CENTRAL AMERICA

ROCKDALE-FORSYTH

Chairperson: Hector Neff

Participants

- 7:40 William R. Swezey, Eugenia J. Robinson and Castulo Puc Raxon; Archaeological Survey of the Southeast Cakchiquel Speaking Region
 8:00 Hector Neff; Episodic Ceramic Development in Pacific Coastal Guatemala
 8:20 Julia Miller, Edward M. Schortman and Patricia A. Urban; Middle Preclassic Remains at the Site of Santo Domingo, Naco Valley, Honduras
 8:30 Anna M. Rago Volk; Formative Villages in Southern Pacific Costa Rica: Comparisons with the Intermediate Area
 8:50 Patricia Hansell; Interpreting Deflated Features of the Past: Intrasite Patterning in a Multi-Component Site from Central Panama

SATURDAY AFTERNOON APRIL 8, 1989

[57] Symposium: THE FRYXELL SYMPOSIUM: HUMANS, DIETS, AND CULTURES—INTERDISCIPLINARY APPROACHES TO THE STUDY OF PREHISTORIC PEOPLES

GRAND BALLROOM A
Organizer and Chairperson: George R. Milner

Participants

- 1:00 William T. Sanders and David L. Webster, The Conjunctive Approach Revisited: The Archaeology of Copan in the 1980's
1:20 Michael D. Wiant, Reflections on a Long-Term Regional Archaeological Program: Thirty Years of Middle Woodland Studies in the Lower Illinois Valley
1:40 John D. Speth and Katherine A. Spielmann, Prehistoric Human Diet and Subsistence Strategies: The Contributions of Faunal Studies
2:00 Gail E. Wagner, Mississippian Farmers of the Central Ohio Valley
2:20 Margaret J. Schoeninger and T. Douglas Price, Bone Composition Studies in Archaeology
2:40 Jane E. Buikstra, A Carbon Isotopic Perspective on Dietary Variation in Late Prehistoric Western Illinois
3:00 Mary Lucas Powell, Paleopathology in Social Context: Health and Ranked Status at Moundville
3:20 James Wood, Henry C. Harpending, George R. Milner and Kenneth M. Weiss, The Osteological Paradox: Linking Mortality and Morbidity in Skeletal Populations
3:40 Discussants: Bruce D. Smith, Donald J. Ortner and Joseph B. Lambert

[58] Symposium: WOMEN IN ARCHAEOLOGY: THE SECOND ANNUAL SYMPOSIUM ON THE HISTORY OF AMERICAN ARCHAEOLOGY

NORTH WING EAST
Organizer and Chairperson: Jonathan E. Reyman

Participants

- 1:00 Jonathan E. Reyman, Women in Archaeology: An Introduction and Some Historical Notes
1:20 Jane H. Kelley, Being and Becoming
1:40 Hester A. Davis, Women in Teocentli: Inroads in the Old Boys Network
2:00 Mary Ann Levine, Women in Americanist Archaeology: The First Generation (1920-1960)
2:20 Cynthia Irwin-Williams, The Position of Women in American Archaeology: 1930-1988
2:40 Frances Joan Mathien, Women of the Chaco: Then and Now
3:00 Carol Mason, From the Other Side of the Looking Glass: Women in American Archaeology in the 1950's
3:20 Discussants: Nathalie F.S. Woodbury and Dena Dincauze

[59] Symposium: ENVIRONMENT, ECONOMY AND SOCIETY IN THE KHABUR DRAINAGE, SYRIA

NORTH WING WEST
Organizer and Chairperson: Frank Hole

Participants

- 1:00 Frank Hole, Patterns of Adaptation in the Jezireh
1:20 Joy McCriston, Environment, Farming, and Mobility in the Khabur Drainage
1:40 Melinda Zeder and Elizabeth Myler, Animal Utilization at Umm Qseir
2:00 James Blackman, Obsidian Exchange During the Halaf and Uruk in the Khabur Drainage
2:20 Thomas E. Davidson, The Halaf-Ubaid Transition in the Wadi Dara Area
2:40 Gregory Johnson, Umm Qseir in Syria and Late Uruk in Greater Mesopotamia
3:00 Discussants: Mary Voigt and Edward Banning

[60] General Session: ARCHAEOLOGY OF THE EASTERN WOODLANDS: THE UPPER MIDWEST

NORTH WING WEST
Chairperson: Robert E. Warren

Participants

- 3:40 Rinita Dalan, William Iseminger, George R. Holley and Melvin L. Fowler, A Reconsideration of the Central Palisade at the Cahokia Site
4:00 William I. Woods and Neal H. Lopinot, Dynamic Patterns of Food Production at Cahokia
4:20 Alan Brown and Bonnie L. Gums, The West Side Story: Archaeological Investigations on the Periphery of the Cahokia Site
4:40 Kevin P. McGowan, Cultural Interaction at the Woodfordian Margin During the Late Woodland and Mississippian Periods in Illinois
5:00 Rochelle Lurie, Robinson Reserve: A Longford Tradition Habitation and Mound Site on the Des Plaines River in Chicago, Illinois
5:20 Robert Salzer, Mississippian Warfare: Archaeology, Oral History and Rock Art in the Upper Midwest

[61] General Session: THE SOUTHERN SOUTHWEST

MILAN
Chairperson: John E. Douglas

Participants

- 1:00 Barbara Roth, Changing Perceptions of the Late Archaic: An Example of the Tucson Basin
1:20 David E. Doyel, Prehistoric Inter-Regional Ceramic Exchange in Southern Arizona
1:40 John E. Douglas, A Reevaluation of Nonlocal Ceramics at Paquime (Casas Grandes) in Chihuahua, Mexico, and the Implications for Regional Interaction
2:00 Margaret Nelson, Prehistoric Strategies of Land Use in Southern New Mexico: A Technological Approach

[62] Symposium: HISTORY AND PREHISTORY IN CENTRAL AMERICA: RECENT RESEARCH

MILAN
Organizer and Chairperson: William R. Fowler

Participants

- 2:40 Stephen Houston, Passions...Stamped on These Lifeless Things: The Historiography of the Classic Maya
3:00 Paul E. Amaroli and William R. Fowler, Ethnohistoric Models for Native Economy in Pacific Guatemala
3:20 Christopher H. Lutz and W. George Lovell, The Maya of Guatemala Under Spanish Rule: Regional Variations in the Nature of Colonial Experience
3:40 Gloria Lara-Pinto, Indigenous Communication Networks in 16th-Century Honduras: The Ethnohistorical Evidence
4:00 John W. Hoopes and Geoffrey G. McCafferty, Out of Mexico: An Archaeological Evaluation of the Migration Legends of Greater Nicoya
4:20 Silvia Salgado, Funerary Patterns of the Middle Polychrome Period in the Southern Sector of Gran Nicoya
4:40 Ricardo Vazquez, Demographic Profile of a Late Precontact Population of the Central Highlands of Costa Rica

[63] Symposium: CRM IN THE 1990'S

VIENNA-STRASBOURG
Organizer: Peter S. Miller
Chairperson: Diane Gelburd

Participants

- 1:00 James J. Hester, The Role of Archaeological Site Preservation in CRM
1:30 Kent A. Schneider and M. R. Beckes, Reinterment in the Real World: Making it Work
1:50 Diane Gelburd, Technology, People and the Future of CRM in the Soil Conservation Service

- 2:10 Evan I. DeBloois, Cultural Resource Management in the USDA Forest Service: The Second Twenty Years
- 2:30 Mark A. Mathis, The Future of State Archaeology in North Carolina: A Prognosis
- 2:50 George Smith, Veletta Canouts, Francis P. McManamon and Richard C. Waldbauer, The Current and Future Archaeological Assistance Program
- 3:10 John G. Douglas, Why Not Manage Cultural Resources?
- 3:30 J. Ned Woodall, SOPA and NARTS: Acronyms Without Acrimony for the 1990's
- 3:50 James J. Miller, CRM 2000
- 4:10 Bruce Rippeteau, Steven Smith, Glen Hanson and Chris Amer, The 10-, 100-, and 1000-Year Future of American CRM: A South Carolina View

[64] Symposium: EARLY PALEOINDIAN ECONOMIES OF EASTERN NORTH AMERICAN PREHISTORY

GRAND BALLROOM B

Organizer and Chairperson: Kenneth B. Tankersley

Participants

- 1:00 Jay Custer and Michael Stewart, Paleoindian Adaptations and Lithic Resource Use in Northeastern North America
- 1:20 Michael J. Shott, Stone Tools and Economies: A Great Lakes Paleoindian Example
- 1:40 Chris J. Ellis, Lawrence J. Jackson and Heather McKillop, Approaches to Paleoindian Economy: New Theoretical Directions for the Southern Great Lakes Region
- 2:00 Donald R. Cochran, Kris D. Richey and Lisa A. Maust, Early Paleoindian Economies in the Glaciated Regions of Indiana
- 2:20 Kenneth B. Tankersley, I Would Rather Be Here Than Out On The Tundra
- 2:40 Albert C. Goodyear, Trends and Patterns in Paleoindian Research in the Southeastern United States
- 3:00 Peter L. Storck and John Tomenchuk, The Function and Significance of an Early Paleoindian Cache of Informal Tools at the Udora Site, Ontario
- 3:20 Barry L. Isaac, Defining the Economy for the Study of Early Paleoindians

[65] Symposium: ARCHAEOLOGY AND THE GLOBAL CLIMATE CRISIS

North Wing, East

Organizer: James A. Bell

Organizer and Chairperson: Joel Gunn

Participants

- 4:00 Joel Gunn, Global Climatic Change and Archaeology: Years of Future Past
- 4:20 James A. Bell, Social Visions and the Making of Decisions in the Global Habitat
- 4:40 Carole L. Crumley, The Role of Regional-Scale Analysis in Climatic Change
- 5:00 Fekri Hassan, Geoarchaeology of Nile Floods and Global Climatic Change

[66] Symposium: NEW DIRECTIONS IN EUROPEAN PREHISTORY

DUSSELDORF

Organizer and Chairperson: Sandra Olsen

Participants

- 1:00 Olga Soffer, Social Transformation at the Middle-Upper Paleolithic Transition: The Implications of the European Record
- 1:20 Sandra Olsen, A Theoretical Approach to Upper Paleolithic Horse Hunting Strategies at Solutre, France
- 1:40 Pamela Vandiver, Martin Oliva and Olga Soffer, The Manufacture and Use of a Paleolithic Female Figurine from Dolni Vestonice, Czechoslovakia
- 2:00 Patricia Rice, Human Images on Cave Walls and Bone: Empirical Comparisons
- 2:20 Paola Villa and Eric Mahieu, Taphonomy and French Archaeology
- 2:40 Pat Shipman, Sardinia's Earliest Immigrants and Their Impact on the Indigenous Fauna
- 3:00 Randolph E. Donahue, Settlement, Seasonality, and Site Function in the Italian Final Epigravettian

- 3:20 Steven Kuhn, Diversity Within Homogeneity: Alternative Perspectives on Mousterian Assemblage Variability

[67] General Session: PALEODIET AND STABLE ISOTOPES

DUSSELDORF

Chairperson: D. Gentry Steele

Participants

- 4:00 Kristin O. Sobolik, Vaughn M. Bryant, Jr. and D. Gentry Steele, Paleonutrition: The Necessary Integration of Disciplines
- 4:20 Renee A. Robinson, Margaret J. Schoeninger and Matthew L. Murray, The Tale the Pine Trees Knew: Stable Isotope Analysis of European Plants
- 4:30 Christian Medaglia, Elizabeth A. Little and Margaret J. Schoeninger, Late Woodland Diet on Nantucket Island (Massachusetts): A Study Using Stable Isotope Ratios
- 4:50 C. Britt Bousman, L. Scott, N. J. Shackleton and J. C. Vogel, Pollen, Stable Isotopes and Paleoenvironmental Reconstructions in Africa

[68] General Session: ARCHAEOLOGY OF THE EASTERN WOODLANDS: THE NORTHEAST

FAYETTE-NEWTON

Chairperson: Mitchell T. Mulholland

Participants

- 1:00 Eleazer Hunt, Late Woodland Settlement Patterns of Western New York: An Explanatory Model
- 1:20 Susan C. Prezzano and Vincas P. Steponaitis, The Development of Late Woodland Settlement Patterns in Central New York: New Evidence From the Boland Site
- 1:40 Sarah W. Neusius, Protohistoric Hunting Strategies in Southwestern New York State: The Evidence from the Ripley Site
- 2:00 Phillip Neusius and Lynne P. Sullivan, In Search of the Erie
- 2:20 Susan D. Grzybowski, A Reevaluation of Prehistoric Land Use Along the Outer Coastal Plain as Exemplified by Long Island
- 2:40 Frank Turano, The Long Island Environment: An Example of Contact Period Environmental Reconstruction and Exploitation
- 3:00 Barbara Anderson Calagero and Anthony R. Philpotts, Rhyolite as a Marker of Site Function
- 3:20 David Bernstein, Trends in Prehistoric Subsistence on the Southern New England Coast
- 3:40 Kenneth Feder, Prehistoric Occupation of Upland Habitat in Southern New England
- 4:00 Doug Kellogg, Paleoenvironmental Reconstructions and the Formation of Maine Coastal Settlement Patterns

[69] General Session: MESOAMERICAN ARCHAEOLOGY: TABASCO-VERACRUZ, OAXACA AND THE VALLEY OF MEXICO

LISBON

Chairperson: George L. Cowgill

Participants

- 1:00 William F. Rust, Olmec Settlement Evidence from La Venta
- 1:20 Veronica M. Kann, Late Classic Politics, Cloth Production and Women's Labor: An Interpretation of Female Figurines at Matacapán, Veracruz
- 1:40 Arthur Joyce, Raymond G. Mueller and Marcus C. Winter, Drainage Basin Dynamics and Prehispanic Social Evolution in the Lower Rio Verde Valley, Oaxaca, Mexico
- 2:00 Elizabeth J. Misner, A Regional Analysis of Lithic Site Distribution in the Valley of Oaxaca
- 2:20 George L. Cowgill, Ruben Cabrera C. and Saburo Sugiyama, Some Implications of Mass Human Sacrifice at Teotihuacan, Mexico
- 2:40 Harry Iceland, Lithic Artifacts at the Teotihuacan Merchants' Barrio

[70] General Session: GREAT BASIN AND THE NORTHWEST

LISBON

Chairperson: Daniel O. Larson

Participants

- 3:20 Richard E. Hughes, Mosaic Patterning in Prehistoric California-Great Basin Exchange
 3:40 Andrea Novick, Lithic Inference and Patterned Redundancy at Gatecliff Shelter, Nevada
 4:00 R. L. Andrews, T. G. Whitley and James M. Adovasio, Perishable Industries from Lakeside Cave, Utah
 4:20 Dennis E. Lewarch, Cheryl A. Mack and James R. Benson, Long-Term Land Use Patterns in the Southern Washington Cascade Range
 4:40 Randall Schalk and Richard L. Taylor, Regional Land Use in the Cascade Mountains, Washington: Changing Strategies Through the Holocene
 5:00 Peter H. McCartney, The Analysis of Prehistoric Settlement Systems in the Canadian High Arctic

[71] General Session: ARCHAEOLOGICAL THEORY

ROCKDALE-FORSYTH

Chairperson: Michael B. Schiffer

Participants

- 1:00 J. Jefferson Reid, Critical Reflections on American Archaeology 1963-1987
 1:20 Alice Portnoy, New Age Archaeology
 1:40 Patrice Teltser, Archaeology and the Historical Sciences
 2:00 Jon Muller, Chaos in Archaeology: Promises and Cautions
 2:20 Frances R. Pickin, Hologeistic Analysis of Archaeological Data
 2:40 Robert L. Bettinger, Anthropological General Theory and the Upper Paleolithic Transition
 3:00 John Doershuk and John P. Hart, Landscape Utilization: An Evolutionary Perspective
 3:20 Richard W. Redding, Subsistence Security as a Selective Pressure Favoring Increasing Cultural Complexity
 3:40 Ewa Wasilewska, Archaeology of Religion, Colors as Symbolic Markers Dividing Sacred from Profane

SUNDAY MORNING APRIL 9, 1989**[72] Symposium: ECOLOGICAL RELATIONS AND SOCIAL FORMATIONS IN ARABIAN PREHISTORY**

VIENNA-STRASBOURG

Organizers and Chairpersons: Christopher Edens and Maurizio Tosi

Participants

- 8:00 Alison Betts, Prehistoric Desertic Adaptive Strategies in Eastern Jordan
 8:20 Curtis Larsen, Paleoenvironments and Settlement in Prehistoric Southeastern Arabia
 8:40 Paolo Biagi and Renato Nisbet, Middle Holocene Maritime Adaptations on the Indian Ocean Littoral of Oman
 9:00 Francesco Fedele, Man-Animal Relations in Prehistoric Yemen
 9:20 Juris Zarins, Arabian-African Contacts Across the Southern Red Sea
 9:40 Maurizio Tosi, Types of Settlements and Economy of Arabia in Middle Holocene Times
 10:00 Geraldina Santini, Social Evolution in Eastern Arabia According to Burial Data
 10:20 Serge Cleuziou, The Beginning of Oasis Life in Eastern Arabia: A Case Study from Hili (UAE)
 10:40 Christopher Edens, Water, Trade and Urbanism on the Littoral of the Arabian Gulf
 11:00 Garth Bawden, Tayma and Commercial Ecology in First Millennium B.C. Arabia
 11:20 William Lancaster, Tribal Formations in Bedouin Arabia
 11:40 Discussants: Geoffrey A. Clark and Henry Wright

[73] Symposium: SETTLEMENT AND SUBSISTENCE IN SOUTHWESTERN ECUADOR

MILAN

Organizers and Chairpersons: Alfred H. Siemens and Patricia J. Netherly

Participants

- 8:30 Carl Spath, The White-on-Red Horizon Reconsidered: Possible Implications of Post-Formative Settlement Changes around the Gulf of Guayaquil
 9:00 Allison C. Paulsen, Prehistoric Environmental Change in Southwest Coastal Ecuador and Its Effects on Local Settlement Patterns
 9:20 Maria Masucci and Elizabeth J. Reitz, Shell Beads and Shark Teeth: Utilization of Marine Resources During the Guangala Phase, Southwest Ecuador
 9:40 Deborah M. Pearsall, Investigating Prehistoric Subsistence Change and Agricultural Intensification in the Jama River Valley, Manabi, Ecuador
 10:00 James Zeidler, Towards a Regional Chronology for Northern Manabi Province, Ecuador: Chrono-Stratigraphic Evidence from the Jama River Drainage
 10:20 Mary Jo Sutliff, Domestic Production of Small Copper Artifacts During the Milagro Culture Occupation at Penon del Rio (Guayas Basin)
 10:40 Patricia J. Netherly, Feasts and Fancy Wares: Jambeli Ceremonial Middens from the Poza Santa Maria Site, Arenillas Valley, Ecuador
 11:00 John E. Staller, Adaptive Strategies of Prehispanic Settlement Systems in the Lower Arenillas River Drainage, El Oro Province, Southern Ecuador
 11:20 Alfred H. Siemens and Alastair Robertson, Wetland Landscapes of Lowland El Oro
 11:40 Discussant: Karen E. Stothert

[74] Symposium: EXCHANGE, INTERACTION AND SOCIAL COMPLEXITY IN OCEANIA

NORTH WING WEST

Organizers and Chairpersons: Michael W. Graves and Terry Hunt

Participants

- 8:00 Terry Hunt and Michael W. Graves, Some Methodological Issues of Exchange in Oceanic Prehistory
 8:20 Patrick Kirch, Specialization and Exchange in the Lapita Cultural Complex of Oceania (1,500-500 B.C.)
 8:40 Stephen Wickler, Lapita Exchange: Recent Evidence from the Northern Solomon Islands, Melanesia
 9:00 Geoffrey Irwin, Colonization and Exchange from Lapita to the Kula
 9:20 John Terrell and Robert L. Welsch, Trade Networks, Areal Integration and Diversity Along the North Coast of New Guinea
 9:40 Michael W. Graves, Terry Hunt and Darlene Moore, Ceramic Production as a Measure of Late Prehistoric Interaction in the Mariana Islands
 10:00 Laura Junker, Trade and Social Complexity in the Philippines
 10:20 Robert U. Bryson, Peer Polity Interaction on Pohnpei
 10:40 Marshall Weisler, Towards Documenting Trade and Exchange in a Complex Chiefdom: An Essay in Method
 11:00 Paul L. Cleghorn, Stone Adzes: Hard Commodities for Interaction Studies in the Hawaiian Islands
 11:20 Barbara Withrow, Prehistoric Production, Distribution, and Use of Stone Adzes: Implications for the Development of Hawaiian Chiefdoms
 11:40 Susan Dobyns, Perspectives from the Recent Past: Indigenous Social Stratification Systems in Culture Contact and Change
 12:00 Discussants: Jim Allen and Timothy K. Earle

[75] Symposium: CURRENT RESEARCH IN LOWER CENTRAL AMERICA

LISBON

Organizers and Chairpersons: Jane Stevenson Day and Frederick Lange

Participants

- 8:00 David C. Grove, Jade Use, the Olmec Question and Inter-Regional Interaction
 8:20 Alice C. Tillett, Signs and Symbols of Preclassic Nicaya

- 8:40 Dorie Reents-Budet and Virginia Fields, Classic Maya Jade and Slate Artifacts from Costa Rica
 9:00 Phoebe L. Hauff, Advances in Mineralogical Studies of Jade
 9:20 Dana Leibsohn, Greater Nicoya Ceramics: Iconographics for Elite Interaction
 9:40 Mark Miller Graham, The Sign of the Jaguar: Stone Sculpture and Inter-Elite Communication in Period VI Lower Central America
 10:00 Jane Stevenson Day, Shared Symbols: Greater Nicoya and Central Mexico
 10:20 Peter S. Briggs, Artistic Autonomy in the Central Region of Panama, B.C. 250-A.D. 1100
 10:40 Frederick Lange, The Bay of Salinas—Coastal Crossroads of Greater Nicoya
 11:00 Marilynn Mueller, Digital Image Processing of Remote Sensing Data for Settlement Pattern Studies in Northwestern Costa Rica
 11:20 Patricia Obando, Scanning Electron Microscope Analysis of Human Skeletal Material from Costa Rica
 11:40 Payson D. Sheets, A Comparison of Digital and Optical Remote Sensing Instruments in Costa Rica
 12:00 Discussants: Ronald L. Bishop and Doris Stone

[76] General Session: RESEARCH REPORTS—EASTERN WOODLANDS

DUSSELDORF

Chairperson: Teresa Rudolph

Participants

- 8:00 Carol A. De Mott, Rodney C. De Mott and Neal H. Lopinot, Archaeobotanical Analysis of a Burned Mississippian Structure at Cahokia
 8:10 Brian G. Redmond, Pots and Pans: An Examination of Ceramic Vessel Function and Early Maize Subsistence Practices in the Lower Ohio River Valley
 8:20 Patrick E. Martin, Susan R. Martin and Lawrence L. Sutter, Piecing Together Copperworking Technology: Accretional Manufacturing at the Lac Labelle Site, Michigan
 8:30 Michael B. Barber, Prehistoric Resource Utilization of the Blue Ridge: The Archaeology of the Jefferson National Forest
 8:40 Craig T. Jr. Sheldon, John W. Cottier and Gregory A. Waselkov, Creek Archaeology on the Lower Tallapoosa River
 8:50 Karl T. Steinen, A Reevaluation of William H. Sear's Excavations at the Etowah Mounds, 1953
 9:00 Dorothy Humpf, Health, Demography, and Status in the Sixteenth-Century Coosa Chiefdom
 9:10 Nina Borremans, Prehistoric Maritime Adaptations in the Cedar Keys

[77] Symposium: RECENT DEVELOPMENTS IN THE ARCHAEOLOGY OF THE ANDROSCOGGIN RIVER DRAINAGE OF MAINE AND NEW HAMPSHIRE

DUSSELDORF

Organizers and Chairpersons: Thomas R. Baker and James B. Petersen

Participants

- 9:40 Bruce J. Bourque, Steven Cox, Daniel Belknap and Thomas Lowell, Carey's Garden: A Multicomponent Archaic Site on Merrymeeting Bay
 10:00 Nathan D. Hamilton, Late Woodland Occupations in Riverine and Coastal Southwestern Maine
 10:20 Ellen R. Cowie, Recent Investigations in the Central Androscoggin River Valley, Maine
 10:40 Patricia H. Baker, Robert I. Birnie and Thomas R. Baker, Preliminary Phase I Results of the HVDC Transmission Tie to Hydro-Quebec from South-Central Maine to the U.S.-Canadian Border
 11:00 Thomas R. Baker and James B. Petersen, Preliminary Results of the Rumford Falls Project Phase I Survey, Rumford, Maine
 11:20 Corbett McP. Torrence and Patricia H. Baker, Archaeological Investigations Conducted in the Richardson Lakes Region of Interior Maine
 11:40 Charles P. Paquin and Thomas R. Baker, The Cascade Falls Site: An Early Late Woodland Habitation Site Located in Gorham, New Hampshire

[78] Symposium: ARCHAEOASTRONOMY IN THE AMERICAS: TESTING THE HYPOTHESES

FAYETTE-NEWTON

Organizer and Chairperson: Ray A. Williamson

Participants

- 8:00 John Carlson, The Divine King: The Maya God C as the Personification of K'u-Divinity, Spirit and the Soul Residing in the Blood
 8:20 R. T. Zuidema, The Pillars of Cuzco: The Calendrical and Astronomical Significance
 8:40 David S. P. Dearborn, Observatories and Ceremony in Tawantinsuyu
 9:00 Patricia Essenpreis and David J. Duszynski, Astronomical Alignments at the Hopewellian Fort Ancient Site
 9:20 James M. Heilman and Arthur F. Goss, Sunrise at SunWatch
 9:40 John White, The Sun Serpents: Two Fort Ancient Solstice Effigies
 10:00 Carol Ambruster and Ray A. Williamson, A Possible Sunwatching Station in Davis Canyon, Utah
 10:20 J. McKim Malville, Frank W. Eddy and Carol Ambruster, Astronomy at Chimney Rock, Southwestern Colorado
 10:40 Charles Tom Hoskinson, Four Suns Wide: Calendric Investigations at a Tohono 'O'odham Site
 11:00 Discussant: Joseph Winter

[79] General Session: MAYAN ARCHAEOLOGY

NORTH WING EAST

Chairperson: Winifred Creamer

Participants

- 7:40 Richard Stallings, A Critical Review of Obsidian Trade Route Models for the Maya Area
 8:00 Carlos Peraza, George J. Bey III and William M. Ringle, A Comparative Analysis of Late Classic Ceramic Complexes from the Northern Maya Lowlands
 8:20 Richard Paine, Estimating Prehistoric Migration from Skeletal Age Distributions: A Case Example from Copan, Honduras
 8:40 Bruce H. Dahlin and Kevin O. Pope, The Hydrological Regime in the Seasonal Swamp at El Mirador and its Implications for Intensive Agriculture
 9:00 Edward M. Schortman and Patricia A. Urban, Craftworking Areas and the Development and Maintenance of Social Complexity in a Late Classic Southeastern Mesoamerican Polity
 9:20 Anthony P. Andrews, The Fall of Chichen Itza: A Preliminary Hypothesis

[80] Symposium: OBJECTS, CONSUMPTION, AND MEANING

NORTH WING EAST

Organizer and Chairperson: Peter S. Wells

Participants

- 10:00 Timothy Kaiser, Production as Meaning: Pottery Making in Neolithic Southeast Europe
 10:20 Michael Dietler, Barbarian Borrowing: Demand for the Exotic and the Political Economy of Early Iron Age Southern France
 10:40 Melanie Wright, Imports and Construction of Cultural Identity
 11:00 Peter S. Wells, Changing Attitudes Toward Objects in Late Prehistoric Europe
 11:20 Joanna E. Ziegler, The Medieval Pieta: Sculpture or Fetish?
 11:40 Steven R. Pendery, Trade and Consumption of the Massachusetts Bay Puritans
 12:00 Marley R. Brown III, Strategies of Status Maintenance among Virginia's First Families: The Symbolic Properties of Consumer Goods in Colonial and Post-Colonial Virginia

[81] General Session: OLD WORLD STUDIES

ROCKDALE-FORSYTH

Chairperson: Deborah I. Olszewski

Participants

- 8:00 Pamela Willoughby, The Nature of Variation Within the African Acheulean
 8:20 Curtis Marean, Sabertooth Cats and Their Relevance for Early Hominid Diet and Evolution

- 8:40 Thomas Gresham; A Settlement Study in the Upper Jubba River Basin, Somalia
 9:00 Stanley H. Ambrose; Radiocarbon Chronology of the Later Stone Age in East Africa
 9:20 James G. Ellison; Hunter-Gatherer Settlement Patterns of the Terminal Pleistocene/Early Holocene in the Horn of Africa
 9:40 Nancy R. Coinman; Refiguring the Levantine Upper Paleolithic
 10:00 Deborah I. Olszewski; Honing the Ahmari Tradition: An Upper Paleolithic Site from the Wadi 'Hasa, West-Central Jordan
 10:20 Alan Simmons; Pygmy Hippos and Early Human Adaptations in the Eastern Mediterranean
 10:40 Zeidan Kafafi, Alan Simmons and Gary Rollefson; Wadi Shu'eib, a Major Neolithic Center in Western Jordan
 11:00 Robert C. Henrickson; Not-So-Urban Renewal: Neighborhood Development and Succession in a Bronze Age Iranian Town

ABSTRACTS OF SYMPOSIA

[1] COLUMBIAN CONSEQUENCES, PART I: THE ENTRADA INTO THE AMERICAN SOUTHEAST

Organized in three sessions, this is the second symposium co-sponsored by the Society for American Archaeology and the Smithsonian Institution Press to anticipate the 1992 Columbian Quincentenary. This three-year series of symposia explores the strategic diversity evident during the early colonial period in the Spanish Borderlands. Participants—including archaeologists, historians, Native Americans, geographers, and art historians—examine the Spanish strategies employed and the diverse Native American counter-strategies that evolved to cope with European intrusions. Papers will also evaluate the success and relevance of contemporary archaeological inquiry into European/Native American interaction in the Spanish Borderlands.

[2] MIDDLE PALEOLITHIC ADAPTATIONS IN EURASIA: REGIONAL PERSPECTIVES

The debate concerning the interpretations of Mousterian assemblage variability is one that has been taught to an entire generation of American archaeologists. New data and methods are now changing the traditional theories, and the current view sees the Mousterian as being much more complex than previously thought. The focus of this symposium is to present major overviews on regional variation in the Middle Paleolithic, based on the most recent excavations in the Western Old World. Major themes stress regional typological, technological, and raw material variability, environmental factors, and inter- and intra-site activity differences. This symposium is organized jointly with *Middle Paleolithic Adaptations in Eurasia: Topical Overviews*.

[3] REGIONAL PERSPECTIVES IN SOUTHEAST ASIAN ARCHAEOLOGY

Archaeology in Southeast Asia is so recent that only a few regions have chronological sequences. Often a sequence is based on a single site. Yet prehistoric research in the area is addressing issues far beyond chronology. The data emerging and interpretive approaches used promise to contribute to the general discipline of archaeology, even if our data may be less comprehensive than other parts of the world. This symposium will present a diverse array of research efforts by archaeologists working in Southeast Asia who seek to comment on diachronic or synchronic patterns in the region's prehistory.

[4] HOUSEHOLD DIFFERENTIATION: CASES FROM THE MESOAMERICAN LOWLANDS

Lowland Mesoamerica presents specific environmental conditions which are shared throughout the region. A comparison of lowland households from the Pacific piedmont, Gulf coast, northern Yucatan, Belize and Guatemala provides an opportunity to explore these similarities. Research on the different cultures of the lowlands relies on a diverse data base in order to reconstruct the ancient economic systems and this symposium brings together ethnographic, ethnohistorical, and archaeological studies in an effort to better understand the basic economic unit of lowland Mesoamerican societies.

[5] THE WOODLAND PERIOD IN THE OHIO VALLEY: A COMPARISON OF CULTURAL DEVELOPMENT IN PRIMARY AND SECONDARY DRAINAGES

The Woodland Period in eastern North America is dominated by development of tribal societies and the Ohio Valley contains some of the best evidence for this evolving complexity. This symposium compares general patterns of adaptation in the Mid-Ohio Valley and its main tributaries. The Ohio River presents different resource sets, ecological risks, and interactional costs from those of its main tributaries, and their relative effects on cultural development are examined. Differences in settlement patterns, site structure, and material culture are highlighted and hypotheses concerning intraregional relationships within this riverine universe are constructed.

[6] THE EVOLUTION OF DOMESTIC ARCHITECTURE IN THE SOUTH CENTRAL ANDES

Recent research in the south-central Andes has provided an unprecedented opportunity to chart the evolution of domestic architecture in the region from the Archaic Period through Inka times. This symposium looks at the transformation of domestic architecture in three areas—the Osmore drainage, a major western valley, and the northern and southern portions of the Titicaca basin, and focuses upon ways in which models and explanations of changes in architecture and the organization of domestic space can be used to explore processes of ethnic and social differentiation, household organization, and the structure of activity performance and site utilization.

[7] EXCAVATING SHELL-BEARING SITES

In spite of over 100 years of investigation in shell-bearing sites we are only slightly closer to decoding the cultural and natural formation processes and human behavior encoded in them. Assumptions about shells and few methodological innovations for excavators of shell-bearing sites are responsible for this

situation. Middle range theory about maritime adaptation has in large part ignored these methodological issues. This set of papers make it abundantly clear what retarding assumptions are and that strides in knowledge are linked to innovations in techniques. The presentations will benefit anyone who will work in a shell-bearing site.

[9] EUROPE IN THE FOURTH MILLENNIUM

Food production spread throughout Europe over the course of at least a millennium. During this time foraging and farming were combined in a variety of ways as food production was adapted to specific social and environmental conditions. By the end of the fourth millennium, Europe was an intricate mosaic: relatively complex societies had emerged in some regions, while incipient farming systems were only beginning to appear in others. Papers in this symposium examine social and economic developments in the Balkans, Aegean, Iberia, Russian Plain, northern France, North European Plain, Denmark/Scandinavia, Alpine Foreland, and Ireland during the fourth millennium B.C.

[10] SOUTH ASIAN ARCHAEOLOGY: RECENT RESEARCH AND NEW THEORETICAL PERSPECTIVES

Archaeological research in South Asia conducted over the past decade has considerably increased our knowledge of pre- and proto-historic and historic developments in this area of the world. In this symposium, results of recent work will be presented, along with theoretical models dealing with state formation, historic empires, and prehistoric social networks. Particular topics to be discussed include: prehistoric lithic procurement systems, the formation and structure of the Indus Valley Civilization, and the political, economic and symbolic organization of historic empires.

[11] CHANGING VIEWS OF CLASSIC MAYA POLITICAL ORGANIZATION

Classic Maya politics have long been of interest to archaeologists, who have sought for over fifty years to explain the composition and organization of Lowland polities. Yet the subject is still not well understood. Some scholars speak of "large-scale centralized polities," while others see only "decentralized city-states" or "feudal kingdoms." It is hard to imagine a more divergent set of opinions, and few seem to agree on which view is correct, or whether a particular model can be generalized to all areas of the Lowlands. This symposium presents new archaeological, epigraphic, and iconographic evidence of Classic political organization. Its goal is to represent diversity of opinion, yet at the same time to move towards consensus on a fundamental problem in American archaeology.

[15] ZOOARCHAEOLOGY IN THE POST-PROCESSUAL AGE: IS THERE A PLACE?

The great boom in the development of Zooarchaeology in the last 20 years has been stimulated by the demands on method made by the research paradigm often labeled either "new" or "processual" archaeology. An explicit view of culture as an adaptive system required monitoring biological variables in the records of ancient behavioral systems. Now the ecological and explicitly scientific emphasis of this familiar archaeology is being challenged by a potpourri of new post-processual approaches which emphasize historical, symbolic, ideational, and political factors. This symposium addresses the part zooarchaeologists can play in these new developments.

[16] THE ARCHAEOLOGY OF GARDEN AND FIELD

Fields and gardens are increasingly becoming the subject of archaeological investigation by practitioners in several disciplines and theoretical schools. Landscape archaeologists use evidence at a variety of scales, from the regional to the microscopic, to learn how people used the land for pleasure and provender. The papers presented here focus on the identification and analysis of gardens and fields as loci of these activities. This symposium aims to give scholars working in different archaeological traditions and world areas the opportunity to exchange information about methodological and technical approaches to the study of past gardens and fields.

[17] THREE-DIMENSIONAL ARCHAEOLOGY: FINALLY A FRONTIER?

Studies concerned with spatial patterning and formation processes in archaeology have, with some exceptions, been restricted to the identification and interpretation of patterning on a two-dimensional plane. Although this simplification may sometimes be necessary and appropriate, archaeological deposits are accretionary phenomena that develop through areal additions in both the horizontal and vertical dimensions. Consequently, a full consideration of either spatial patterning or formation processes requires detailed examination of both dimensions. This symposium explores the roles of theory, method, and technique in archaeological spatial analysis necessary for developing a three-dimensional contextual framework for interpreting complex archaeological records.

[18] WOMEN AND PRODUCTION IN PREHISTORY

This symposium explores the potential of using an explicitly feminist social theory in archaeological research and interpretation by applying gender categories to familiar and original sets of archaeological data. This approach goes beyond finding men and women in the archaeological record; it sees gender as an issue of history and as rooted in the dynamics of material and human resources. Each paper shows how attention to gender dynamics can illuminate a broad spectrum of issues concerning production in prehistory. The application of this perspective is seen to radically reframe both archaeological theory and evidence.

[19] RETHINKING THE TERMINAL ARCHAIC-WOODLAND PERIOD TRANSITION IN THE NORTHEAST

This symposium addresses a period of prehistory that witnessed increased complexity among hunter-gatherer populations in northeastern North America. The Terminal Archaic and early portions of the Woodland period have been long characterized as a transitional era from nomadic hunter-gatherer adaptations to a more sedentary incipient cultivator pattern across much of the region. Environmental fluctuations and apparent changes in human population densities have been correlated with notable mortuary ceremonialism and long distance exchange networks ca. 1,500 B.C. to A.D. 300. Individual contributions employ reanalyzed and recent data from the region to refine one or another aspects of prevailing models about this period of putative transition.

[20] ADVICE AND DISSENT: AN EXCHANGE OF VIEWS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

This symposium will involve extemporaneous discussion by the participants of issues of relevance to the discipline of archaeology, with special emphasis on assessment, redefinition or reaffirmation of intellectual orientation, direction, and methodology. Part I of the program will focus on the nature, scope and goals of archaeological investigation. Part II will be concerned with an evaluation of the conceptual tools and learning strategies with which archaeological goals are approached, as well as a discussion of the direction that the discipline may or should take in the future. Questions or comments from the audience will be encouraged.

[22] COLUMBIAN CONSEQUENCES, PART II: THE IMPACT OF HISPANIC COLONIZATION IN THE SOUTHEAST AND CARIBBEAN

See Symposium [1].

[23] SAA SPECIAL SESSION: OUR VANISHING PAST—THE WILLFUL DESTRUCTION OF A NATION'S HERITAGE

The Society for American Archaeology has undertaken a major project to examine the looting and vandalism of archaeological sites in this country and the consequent destruction of irreplaceable archaeological information. This symposium is an integral component of that project, and will be followed in May by a major working conference. Here, specialists in various aspects of the problem will provide information on the magnitude and dimensions of looting, its impact on the country's heritage, current legal and technical methods of protecting our data base, the role of public education in combating the problem, and what the SAA membership can and should do about the issue.

[24] MIDDLE PALEOLITHIC ADAPTATIONS IN EURASIA: TOPICAL OVERVIEWS

The Middle Paleolithic is currently enjoying increased attention as new data and theories point to this period as being pivotal in the evolution of modern *Homo sapiens* and modern cultural behavior. This symposium explores some of the new kinds of questions that are being asked concerning Mousterian assemblages and their reflections of Neanderthal behavior, including the interpretation of typological variability, the nature of the subsistence base, curatorial, and the question of style and symbolism. This symposium is organized jointly with *Middle Paleolithic Adaptations in Eurasia: Regional Perspectives*.

[26] MAYA SUBSISTENCE: ARCHAEOLOGICAL AND ETHNOBIOLOGICAL APPROACHES

Problem-oriented research and the use of specialized recovery techniques such as flotation in recent years by Maya archaeologists has led to the recovery of a diversity of prehistoric plant food and animal remains. Ethnobiology—which includes the study of modern, indigenous peoples' use of plants and animals—can provide a useful interpretative framework for ancient food remains. In this symposium, various archaeological and ethnological studies of Maya diet are presented. These studies provide new perspectives on ancient Maya agriculture, the ancient landscape, and use of wild plants and animals.

[27] NATIONAL FORESTS IN THE SOUTH: CULTURAL RESOURCES AND MANAGEMENT

This session will highlight the cultural resources, research and management activities within the National Forests of the Southern Region of the U.S. Forest Service. An overview of the evolution of the Cultural Resource program from its beginning in 1973 to its current status will be given. Other management concerns of Forest Service cultural resources specialists will also be discussed. Other papers will discuss research into lifestyles of Archaic and Late Prehistoric peoples in eastern Kentucky, Georgia, Mississippi, North Carolina, and Arkansas. A discussant from the Arkansas Archaeological Survey will also provide an additional viewpoint of these papers.

[29] CERAMIC PRODUCTION AND DISTRIBUTION: AN INTEGRATED APPROACH

Production and distribution are interrelated components of all economic systems. Nevertheless, studies of pottery economics have typically considered one or the other in isolation. This symposium treats production and distribution as interacting subsystems of the broader ceramic economy. The contributed papers present archaeological and ethnoarchaeological data from a variety of Old and New World ceramic economic systems and examines the ways that production and distribution processes influence one another. We suggest that studying ceramic production and distribution as integrated subsystems is a valuable approach for understanding prehistoric pottery economics.

[30] ARCHAEOFAUNAS AND SEASONALITY

This symposium focuses on techniques for examining incremental growth structures and methods of interpreting them. Papers in the symposium address this technological and methodological theme, using substantive data for illustrative purposes only. The rationale for offering this symposium lies in the perceived need to clarify which examination techniques and interpretive methods are applicable to which types of data, and to see if techniques, methods and terminology can be standardized. These issues need to be resolved before a) reliable seasonality interpretations of substantive data can be made, and b) seasonality analyses and their interpretations can be widely and clearly understood.

[31] KALINGA ETHNOARCHAEOLOGY

The Kalinga Ethnoarchaeology Project was initiated in 1973 and another year of fieldwork has just been completed among these tribal peoples of the mountains of northern Luzon, the Philippines. This project provides an unprecedented longitudinal view of a pottery making and using society. During the past year, information on pottery trade, "use-wear", use-life, as well as economic and agricultural data, were collected. For the first time, a project focused upon Kalinga basketry was undertaken. The papers in this symposium report results of the research and explore the implications for archaeological interpretation.

[33] COPING WITH SITE LOOTING: SOUTHERN PERSPECTIVES

Digging up artifacts and human skeletal remains for profit, fun, or both, is epidemic. The record of human prehistory on our continent is being dug up and kept, traded or sold at an unprecedented rate. The historical record is not immune to plunder, either: Revolutionary and Civil War sites are a lucrative target. We spend millions of dollars "protecting" our cultural heritage, the collector makes millions selling it. This symposium addresses ways that the professional archaeological community and the American public are coming to terms with one another to protect, preserve, and use heritage resources in the south.

[35] THE EVOLUTION OF COMPLEX SOCIETY IN EARLY AND MIDDLE FORMATIVE MESOAMERICA: NEW EVIDENCE AND INTERPRETATIONS

During the past two years there have been over a dozen new archaeological projects exploring Early and Middle Formative cultures in eastern Mesoamerica (ca. 2,000 to 1,000 B.C.). These researchers have demonstrated that this period was one of rapid cultural evolution and surprising social complexity. New evidence on these early cultures shows the presence of ranking, public architecture, long distance trade, economic specialization, and interregional ideological systems. This symposium will present this most recent evidence from excavations in Veracruz, Chiapas, Guatemala, and El Salvador. We will also interpret and discuss implications of these new findings for the theoretical debate on the evolution of early Mesoamerican civilization.

[36] HOUSEHOLDS AND SETTLEMENTS IN THE MISSISSIPPIAN PERIOD

While the excavation and analysis of households and communities has for years been an important part of research on the Mississippian Period, a growing awareness of the explanatory potential of the domestic context is expanding our understanding of the variability in social and material adaptive strategies. The contributors to this symposium examine the basic economic and social units of Mississippian society, from diverse areas of the Eastern United States, by exploring the functional

differences in domestic material assemblages, the relationship of farmsteads to larger-order communities, and organizational complexity within communities.

[38] ETHICS IN PROFESSIONAL ARCHAEOLOGY

While certain dilemmas have been widely debated of late (e.g., "reburial"), there remain an array of concerns likely to prove troublesome over the next decade. Focus is on these anticipated problems, including those created by recent Federal and state statutes and procedures. To meet these new challenges it is essential that these problems be defined and an appropriate stance proposed. An emphasis is placed on the need for a consensus ethic among archaeologists to create a united and effective professional body.

[39] ARCHAEOOMETRY IN ACTION

The surge of scientific innovations of recent decades has greatly influenced the discipline of archaeology. Science-based archaeological research (often called *Archaeometry*) has grown steadily, using analytical techniques for cultural interpretations. Now few archaeological studies are developed without the support of paleoenvironmental data, calibrated radiocarbon dates, and artifactual structural analyses. *Archaeometry in Action* will present eleven analytical procedures that are currently being employed in archaeology to help resolve and explain archaeological problems and processes.

[41] HUNTER GATHERER MOBILITY, RESOURCE TRANSPORTATION AND STORAGE

Bringing consumers and resources together in time and space is a foremost problem to be solved by hunter-gatherers, and of considerable interest to archaeologists. Hunter-gatherer groups may move to the resource location, may collect the resource and transport it to another location, may collect and store the resource, or use these and similar strategies in combination. This symposium considers the various factors which may affect the efficiency of alternative strategies. Hypotheses generated from evolutionary theory are tested in case studies of plant, animal, and lithic material exploitation.

[44] COLUMBIAN CONSEQUENCES, PART III: THE MISSIONS OF LA FLORIDA

See Symposium [1].

[45] CORRIDOR STUDIES IN CONTRACT ARCHAEOLOGY

Contract archaeological surveys of highways, powerlines, and communications corridors have resulted in an immense "grey literature" of thousands of miles of reconnaissance surveys, hundreds of testing excavations, and many data recovery projects around the country. This symposium offers an opportunity to explore the potentials and limitations of corridor studies to become a substantial data base for regional prehistory. This potential data base is promising, yet there could be more consensus as to how corridor studies are implemented, interpreted, and assessed.

[46] VILLAGE COMMUNITIES IN EARLY COMPLEX SOCIETIES

Moving beyond the traditional research focus on large centers in urban and state systems, this symposium examines and synthesizes recent investigations of small communities in early complex societies of Mesoamerica and the Near East. Participants discuss the range of social and economic activities performed by small communities, the nature and degree of village integration into regional networks, the utility and meaning of the concepts "urban" and "rural," and the larger implications of small site studies for the analysis of early complex societies.

[47] APPLICATIONS OF MAMMALIAN MORTALITY DATA FOR THE STUDY OF PREHISTORIC HUMAN PREDATOR ECOLOGY

The theme of the symposium is the use of mortality data in archaeological research on human/hominid predator ecology. Secure applications of mortality models depend on a comprehensive understanding of the causes of variation in the age structures of death assemblages. Issues include seasonal and long-term demographic cycles that affect living prey or carcass availability along with relationships between predator strategies and prey mortality patterns. The papers represent a diverse set of approaches, including mortality profile analysis, seasonality analysis, inter-specific predator comparisons, as well as actualistic studies of death patterns in contemporary mammalian populations.

[49] ARCHAEOBOTANY THROUGH PHYTOLITH ANALYSIS

Phytolith analysis has proven to be an enormously flexible and productive tool for investigating archaeobotanical and paleoecological questions. The papers presented in this symposium represent a wide range of archaeological applications, from analysis of diet to identification of specific crops to reconstruction of animal husbandry practices. Recently developed extraction techniques have expanded and improved the data recoverable from coprolites and tooth cementum, as well as from non-opal phytoliths. Ongoing research into the complex issues of phytolith identification and

taphonomy are also reported. The symposium comprises a state-of-the-art presentation of this significant but relatively under-utilized archaeobotanical methodology.

[50] PALEOSHORELINES AND PREHISTORIC SETTLEMENT

The evaluation of coastal archaeological sites is a complicated process involving collaboration between archaeologists and various natural scientists. It is of particular importance to understand how the location of the site differs from that which it occupied at the time it was inhabited. In all areas, change in sea level must be factored in: in many areas isostatic rebound must be added to the equation, and in the most complicated, co-seismic uplift, subsidence and tilt must also be evaluated and taken into account. The papers in this symposium examine both methods of arriving at satisfactory reconstructions and results in various areas.

[51] CULTURE CHANGE AND VARIABILITY IN THE UPPER PALEOLITHIC

The unprecedented pace of human cultural evolution which began with the Upper Paleolithic at around 35,000 years ago has been the subject of discussion for several decades. Recent approaches to the material store of the Upper Paleolithic have shed new light on the nature of Upper Paleolithic innovation and continuity. This symposium will address both the change through time and the contemporary variability visible in faunal exploitation and land use strategies, art and body ornamentation, and lithic and bone antler technologies during the Upper Paleolithic throughout the Old World.

[57] THE FRYXELL SYMPOSIUM: HUMANS, DIETS, AND CULTURES—INTERDISCIPLINARY APPROACHES TO THE STUDY OF PREHISTORIC PEOPLES

The Fryxell interdisciplinary session addresses from several perspectives the composition and adequacy of past diets, interrelationships between nutrition and infectious diseases, linkages between paleopathology and paleodemography, and the archaeological study of the adaptive stance of prehistoric populations from several parts of the Americas. New techniques and research strategies have clarified a number of critical human-environmental relationships and identified additional areas for future investigation. Collectively, the papers underscore the importance of truly integrative approaches to the study of past peoples and cultures as well as the close relationship between archaeology and biologically oriented sciences.

[58] WOMEN IN ARCHAEOLOGY: THE SECOND ANNUAL SYMPOSIUM ON THE HISTORY OF AMERICAN ARCHAEOLOGY

Women have played a major role in the development of American archaeology, especially in the Southwest and Mesoamerica. Their contributions have been numerous, varied, and important, e.g., Florence Hawley Ellis's research correlating dendrochronology, masonry styles, and ceramics; Anna Shepard's technical studies of ceramics, and Tatiana Proskouriakoff's work on Mayan architecture and glyphs. Nevertheless, histories of American archaeology have paid insufficient attention to these contributions and those of other women scholars. This symposium examines the work of a number of these women, how women are recruited to archaeology, and work within the discipline.

[59] ENVIRONMENT, ECONOMY AND SOCIETY IN THE KHABUR DRAINAGE, SYRIA

In the third and second millennium B.C. the Khabur drainage of northeast Syria saw the emergence of a number of large walled cities that are identified in historic texts. The antecedents to these developments are the focus of this symposium which draws upon excavations and surveys of sites dating from the sixth to fourth millennium B.C. and considers (1) problems of environmental change; (2) varied human economic adaptations to the riverine and steppe habitats as seen in floral and faunal remains and settlement patterns; and (3) social and political interactions as manifest in trade goods, intrusive ceramic complexes, size distributions of sites, and changes in populations.

[62] HISTORY AND PREHISTORY IN CENTRAL AMERICA: RECENT RESEARCH

This symposium brings together recent archaeological and ethnographic research in Guatemala, El Salvador, Honduras, and Costa Rica. Collectively, the papers cover a broad time span from the Maya Classic (A.D. 250-900) through the Colonial period (1525-1821). Several common themes are addressed through diverse methodological approaches: the reliability of evidence, interaction, the reconstruction of economic systems, social status, political organization, and contacts with greater Mesoamerica and Lower Central America. The unification of papers on prehistory and history reveals many areas of mutual interest to archaeologists and historians.

[63] CRM IN THE 1990'S

This symposium is intended for discussion of the method and theory of cultural resource management and of public policies that affect cultural resource conservation. Cultural Resource Management will be viewed from the perspectives of managers of programs that have significant impact upon the

nation, region, or state. Topics considered will include: direction of agencies at the start of a new federal administration; meeting conservation goals; developments in rules, regulations, and guidelines; funding levels; employment trends; professional certification requirements; recommendations for CRM professionals, academic archaeologists, and students; and predictions for CRM in the Year 2000.

[64] EARLY PALEOINDIAN ECONOMIES OF EASTERN NORTH AMERICAN PREHISTORY

This symposium treats "economy" as the mechanisms (production, consumption, distribution, exchange) of human adaptation. Over the past 60 years, two dominant and competing models of early Paleoindian (11,500-10,500 B.P.) economy in eastern North America have emerged—specialized hunting and generalized foraging. Both models are predicated upon assumptions about the antiquity of humans in the New World, the behavior of modern hunter-gatherers, paleoecological reconstructions, and the temporal placement of large herbivore extinctions. This symposium evaluates these assumptions by identifying patterns in lithic exploitation and human settlement.

[65] ARCHAEOLOGY AND THE GLOBAL CLIMATE CRISIS

In the last five years a scientific consensus has arisen that global warming due to atmospheric pollution is inevitable. The United Nations, the U.S. Department of Energy and Environmental Protection Agency, to name a few, have sponsored large workshops on the problem which were well attended by many disciplines. Archaeologists have been notably absent. Why is this obvious repository of information on human responses to global climate change being ignored? This symposium addresses recent developments in archaeology which might make the data of archaeology more accessible to the global climate community.

[66] NEW DIRECTIONS IN EUROPEAN PREHISTORY

European prehistory has maintained a long held reputation as the bulwark of typological classification. Work conducted by Francois Bordes and his predecessors established this sturdy foundation some years ago, but theoretically-oriented research aimed at understanding cultural processes has been slow to follow. The purpose of this symposium is to demonstrate that current research, particularly that conducted by American-trained archaeologists, is expanding into some extremely innovative areas. New technology and information derived from other disciplines, as well as state-of-the-art archaeological theory, are contributing to this rapid advancement in European prehistory.

[72] ECOLOGICAL RELATIONS AND SOCIAL FORMATIONS IN ARABIAN PREHISTORY

Recent research in Arabia addresses three clusters of interests: 1) Arabia as the hearth of distinctive social, economic and ecological adaptations to desertic conditions; 2) as a circulator of materials, people and ideas between East Africa, South Asia, and the Near East; and 3) as a periphery to the agrarian centers of civilization. These interrelated themes reflect more general questions of human adaptation to desertic environments and of the dynamic relationship of such marginal areas to agrarian centers. The papers of this symposium present various aspects of these common problems in light of recent Arabian research.

[73] SETTLEMENT AND SUBSISTENCE IN SOUTHWESTERN ECUADOR

In recent years there has been much new work on various aspects of Prehispanic southwest Ecuador. Settlement surveys have been carried out and important new sites have been found, especially within the most recent phases of the Tahuin Project in lowland El Oro province. Ceramic phases and chronologies are being refined; resource use, water management and paleoenvironmental change are being clarified. This symposium presents new insights in all of these respects. It brings together young professionals and seasoned scholars, a group within which there is already a good deal of interchange.

[74] EXCHANGE, INTERACTION AND SOCIAL COMPLEXITY IN OCEANIA

In the past decade archaeologists working in Oceania have made considerable advances in the identification of prehistoric exchange, often involving the transport of a variety of commodities over sizeable ocean distances. At the same time the role of exchange in the evolution of social complexity has received considerable attention, especially among the stratified societies with craft specialists. This symposium brings together researchers working throughout Oceania in both modern and ancient contexts to examine commodity exchange, group interaction, and societal evolution.

[75] CURRENT RESEARCH IN LOWER CENTRAL AMERICA

Current research in the Lower Central American region is advancing on two innovative fronts: 1) the application of instrumental analysis to archaeological data (remote sensing, neutron activation, X-ray, S.E.M. technologies) and 2) the combined application of archaeology, art history and technology. Research in these areas is directed towards a better understanding of the social implications of aesthetic development and iconographical systems. Papers will focus on ceramics, stone, metallurgy, jade and

mortuary practices and will evaluate the stylistic evidence for indigenous development and external influences (Central Mexico, Maya, Olmec) in this intermediate region.

[77] RECENT DEVELOPMENTS IN THE ARCHAEOLOGY OF THE ANDROSCOGGIN RIVER DRAINAGE OF MAINE AND NEW HAMPSHIRE

Archaeological data recovered from recent investigations in the Androscoggin River drainage of Maine and New Hampshire allow us to refine our models of aboriginal occupation and utilization from the interior mountainous uplands to the coastal lowlands. The papers included in this symposium will present new information for the entire aboriginal cultural sequence from the Paleoindian through Late Ceramic and Contact periods as well as address questions of local and regional importance such as settlement patterning, subsistence strategies, and intra- and interregional trade and exchange.

[78] ARCHAEOASTRONOMY IN THE AMERICAS: TESTING THE HYPOTHESES

The general hypothesis that PreColumbian Native Americans in North, Middle and South America watched the sky carefully and incorporated this astronomical knowledge in structures and other aspects of their material culture has received increasing attention over the past two decades. Contributors to this symposium will discuss recent archaeoastronomical findings in the Americas and explore how data on astronomical alignments may shed additional light on the adaptive strategies, ritual practices, and calendric knowledge of the cultures who constructed them.

[80] OBJECTS, CONSUMPTION, AND MEANING

Lively interest is developing in many different disciplines in the social meaning of manufactured objects. Archaeology can make special contributions to the ongoing discussions because of archaeologist's concern for understanding the production and use of an object in its full cultural context, and because of the unique time depth with which archaeology deals. The papers present case studies selected from a variety of different contexts to illustrate the kinds of social meanings that people ascribe to the objects they make, acquire, and consume.

ABSTRACTS OF PAPERS

Abel, T. J. (see Stothers, D. M.) [19]

Abrams, Elliot (Ohio)

[5] EARLY WOODLAND SETTLEMENT PATTERNS IN THE HOCKING RIVER VALLEY, OHIO

A model of settlement during the Early Woodland period in southeastern Ohio is considered. First, the Boudinot site, an open-air hamlet, is described. These and complementary data suggest that hamlet occupation was seasonal and dynamic yet spatially restricted to local mounds. Then, the Armitage Mound, one in a large concentration of mounds, is described. These new data suggest that this mound was the locus of recurrent activities by specific clusters of hamlets, reflecting the growth of territorially-distinct social corporate groups. This preliminary model is compared with others from the region.

Adams, Richard E.W. (Texas-San Antonio)

[11] CLASSIC MAYA POLITICAL UNITS AS VIEWED FROM RIO AZUL

Rio Azul data bearing on Classic Maya polities best fits a sequence of Late Preclassic "principalities" giving way to regional states. Comparative data from field archaeology, epigraphy, ceramic analysis, and rank-size urban analysis are cited. A uniform model does not seem appropriate for all Maya regions.

Adler, M. (see Lipe, W.) [12]

Adovasio, J. M. (see Hyland, D.) [39]

Adovasio, J. M. (see Andrews, R. L.) [70]

Ahler, Steven R. (Illinois State Museum)

[5] THE HANSEN SITE (15GP14): A MIDDLE/LATE WOODLAND SITE NEAR THE CONFLUENCE OF THE OHIO AND SCIOTO RIVERS

Excavations performed in 1985 at the Hansen Site in northeastern Kentucky focused on a buried paleosol containing evidence of Middle to Late Woodland occupation. Features and structures yielded radiocarbon dates between 300 and 600 A.D. Analysis of the diagnostic cultural material, features and structures, and non-diagnostic material classes suggested two periods of occupation, both of which were assigned to the Newtown phase. An overview of the material culture, chronology and internal site structure of the Hansen Site is presented, and some inferences are drawn regarding changes in internal and external relationships during the Newtown phase.

Albright, Don (Macdonald College-McGill)

[30] PRECISION OF SEASONALITY DETERMINATION IN RINGED SEALS (PHOCA HISPIDA)

Ringed seal (*Phoca hispida*) remains form an important part of many arctic middens. Examination of teeth from this species is often used to approximate season of death and therefore time of occupancy of a site. To measure repeatability of perception of layer type forming at the edge of either dentine or cementum, seven readings of each tooth from a sample of several hundred were made. The data were from a modern kill for which the date of death was known. Results suggest that examination of teeth for seasonality determination can be highly subjective.

Albright, D. (see Savelle, J. M.) [30]

Aldenderfer, Mark S. (Northwestern)

[6] ARCHAIC PERIOD DOMESTIC ARCHITECTURE FROM THE OSMORE BASIN

Excavations at Asana, a deeply stratified open air site dated from approximately 10,000-3,000 B.P. in the high sierra of the Osmore basin, have provided a unique perspective on changes in domestic architecture throughout the Archaic Period. This paper describes domestic architecture at four "instants" of time—8,800-8,600 B.P., 7,000-6,000 B.P., 5,000-4,500 B.P. and 4,000-3,600 B.P.—and discusses the meaning of changes in the organization and use of space, activity performance, and community structure observed throughout the Archaic.

Allen, Jim (La Troube) [Discussant 74]

Allen, Kathleen M. (Tulane)

[29] CERAMIC MANUFACTURE AND DISTRIBUTION AT THE HOUSEHOLD LEVEL: THE IROQUOIS

The production and distribution of domestic ceramics at the household level is examined. Ceramics from several middens at one Iroquoian village site are investigated for patterning of form and style that support hypotheses of household production. Evidence for other aspects of production including seasonality and compatibility with other activities is presented. The number of female producers

within each longhouse and for the village as a whole are estimated. The implications of these production variables are discussed in relation to distribution at the household level.

Amaroli, Paul E. and William R. Fowler (Vanderbilt)

[62] ETHNOHISTORIC MODELS FOR NATIVE ECONOMY IN PACIFIC GUATEMALA

Recent ethnohistoric research on the principal ethnic groups of Pacific colonial Guatemala (the Quiche, Tzutujil, Cakchiquel, Xinka, and Pipil) has produced a wealth of data on native economy. The Conquest-period Pipil of El Salvador, for example, had a vibrant system of regional interaction that moved both staples and luxury goods through a system that linked coastal and interior settlements. From analysis of the ethnohistoric data, models are constructed that help clarify and explain aspects of the archaeological evidence on Precolumbian economy in the area.

Amaroli, P. E. (see Arroyo, B.) [35]

Ambrose, Stanley H. (Illinois)

[81] RADIOCARBON CHRONOLOGY OF THE LATER STONE AGE IN EAST AFRICA

The date of the transition from the Middle to the Late Stone Age in Africa is considered to have occurred either around 40,000 B.P. or around 30,000 B.P. Charcoal from the uppermost Late Pleistocene Late Stone Age layers at Twilight Cave (Central Rift Valley, Kenya) has been dated to 35,800±550 B.P. The top of the Middle Stone Age horizon is two meters below this date, indicating the Middle to Late Stone Age transition took place well before 36,000 B.P. The context and associations of this date will be described, and the continent-wide evidence for the Middle to Late Stone Age transition will be reassessed.

Ambruster, Carol (Villanova) and Ray A. Williamson (Office of Technology Assessment (U.S. Congress))

[78] A POSSIBLE SUNWATCHING STATION IN DAVIS CANYON, UTAH

The possible astronomical significance of two Anasazi structures is examined. They are located east of Canyonlands National Park on the north and south arms of a mesa overlooking Davis Wash. Situated about 50 meters above the plain, both structures are strategically placed for observing the local terrain. Both could also have been used as sunwatching stations for determining a calendar. However, only the south ruin appears to be astronomically aligned—to the summer and winter solstices. Several hypotheses are explored and the archaeological tests necessary to resolve whether or not these alignments may have been intentional are discussed.

Ambruster, C. (see Malville, J. M.) [78]

Amer, C. (see Rippeteau, B.) [63]

Amick, Daniel (New Mexico)

[8] ASSEMBLAGE AND FEATURE DIVERSITY AMONG THE KUNG: IMPLICATIONS FOR ARCHAEOLOGICAL STUDIES OF FORAGER SETTLEMENT SYSTEMS

Archaeologists often imply settlement characteristics from relative heterogeneity of artifact assemblages. Artifact diversity has commonly been related to type of occupation, organization of settlement system, length of occupation, and site reoccupation, as well as other aspects of site structure and occupational history. Relationships of artifact and feature diversity among Kung camps reported by Yellen (1977) are used to examine these variables so often used in interpreting hunter-gatherer assemblages. Organizational factors such as functional site types and group composition, and situational factors of resource structure and game encounter, have significant effects on diversity measures within foraging systems like the Kung.

Andrews, Anthony P. (New College of USF)

[79] THE FALL OF CHICHEN ITZA: A PRELIMINARY HYPOTHESIS

Maya chronicles attribute the fall of Chichen Itza to a revolt in which native Yucatec Maya overthrew the Itza and destroyed their capital. We have yet to identify the causes of the revolt, and the reasons for the Itza failure to maintain a strong state in the northern lowlands. The likely causes may have been an overexploitation of the internal economy of northern Yucatan coupled with the fact that the Itza capital was too far removed from its primary sources of economic power, which was based on a control of coastal resources and access to long-distance trade networks.

Andrews, R. L., T. G. Whitley and James M. Adovasio (Pittsburgh)

[70] PERISHABLE INDUSTRIES FROM LAKESIDE CAVE, UTAH

Analysis of the collection of perishables recovered from Lakeside Cave (42BO385), Utah indicates that four types of coiled basketry and five structural types of cordage were made, used or discarded at

this special activity locus. Multidimensional scaling of metric attributes of this assemblage as well as scrutiny of nominal attributes indicate that it is possible to isolate microshifts within the perishable industries which may reflect either functional or, less likely, population based changes. Additionally, comparison of the Lakeside perishables to those recovered from nearby Hogup Cave (42BO36) and Danger Cave (42TO13) indicates that the populations which exploited these sites throughout their coeval occupancy were different. Specifically, it appears that while Lakeside and Hogup Caves were utilized by the same or very closely related groups, Danger Cave was visited by a different series of populations.

Anthony, David (Hartwick)

[9] FROM ETHNICITY TO ECOLOGY: THE TRANSFORMATION OF BOUNDARIES IN THE COPPER AGE OF THE SOUTHWESTERN USSR

Between about 4,000 and 3,000 B.C. the Dnieper River was perhaps the most clearly defined cultural boundary in all of Europe. To the west were complex farmers living in substantial towns, practicing metallurgy and sophisticated ceramic manufacture; while to the east, in a comparable environment, were simple incipient farmers still largely dependent on fishing and hunting, living in small hamlets without advanced pyrotechnology. This apparent ethnic boundary disappeared after about 2,700 B.C., to be replaced by different but equally significant cultural separations that followed ecological boundaries. The emergence of a recognizable Bronze Age "Barbarian Europe" was conditioned by this shift in cultural trajectories in the southwestern USSR.

Arnold, Bettina (Harvard) and Egon Gersbach (Institut für Vor- und Frühgeschichte-Tübingen)

[48] THE KARTOMAT: A FIELD DRAWING MACHINE

Drawing sections and plans is one of the most time-consuming aspects of archaeological excavations. In a field where time is literally money, and excavators are often working only hours ahead of bulldozers, it is surprising that no apparatus has been developed in this country which would make the recording process more efficient. A drawing device of this type, developed in the late 1970's by Dr. Egon Gersbach of the University of Tübingen, has been in use in the field in Germany for the past decade and will be presented in this paper with Dr. Gersbach's cooperation. The author was fortunate enough to experience the efficiency of the Kartomat firsthand this past summer, and her impressions, together with slides of the apparatus in action, will be included in the presentation.

Arnold, Dean E. and Alvaro Nieves (Wheaton)

[29] FACTORS AFFECTING CERAMIC STANDARDIZATION

The notion of standardization in pottery production has recently been used as an indicator of ceramic specialization. Yet, this notion and the assumptions behind it are still largely untested. An attempt to identify some factors that affect the standardization of ceramic vessel shapes in Ticul, Yucatan is described. Approximately 1,600 vessels of 16 shapes were measured and analyzed statistically. Interpretation of these analyses within the ethnographic context of the workshop industry in Ticul provides insight into the factors associated with variability in dimensional uniformity as a function of market, technique, the individual potter-producer, the family and the potter's own views of standardization. We suggest that the coefficient of variation should not supplant the use of the standard deviation as an expression of standardization.

Arnold, Philip J. (New Mexico)

[4] THE IMPLICATIONS OF SPATIAL AVAILABILITY FOR HOUSELOT REFUSE DISPOSAL IN THE TUXTLAS

Domestic craft industries were an integral component of many prehistoric household economies. The scale and intensity of these industries have specific spatial and temporal implications for the organizational structure of residential activities. The material consequences of this organizational structure are explored, with special emphasis on the availability of space as a conditioner of refuse management. Ethnoarchaeological data are used to demonstrate that domestic disposal patterns vary in a predictable fashion as a function of effective houselot space. These findings underscore the need for an emphasis on residential activity area analyses within sedentary social systems.

Arroyo, Barbara, Arthur Demarest, Paul E. Amaroli (Vanderbilt) and Thomas L. Jackson (Archaeological Research Facility, UC-Berkeley)

[35] THE EL CARMEN SITE, EL SALVADOR: NEW INFORMATION ON THE EARLY PRECLASSIC OF SOUTHEASTERN MESOAMERICA

Recent excavations at the El Carmen site have uncovered the earliest village occupation and ceramics yet documented for El Salvador. The settlement dates to the Early Preclassic and has ceramics and artifacts similar to the Ocos culture of Chiapas, nearly doubling the known distribution of that culture.

The results of ecological, ceramic, and obsidian studies for El Carmen are presented that describe the nature of the occupation, its Ocos affiliation, and its significance for interpretations for Early Preclassic interregional contacts and cultural evolution.

Baber, K. C. (see Miller, M. E.) [40]

Backer, Anna (New Mexico) and Michel Guilbaud (Direction des Antiquites de Poitou-Charentes)
[51] THE SPATIAL DISTRIBUTION OF MICRODEBITAGE IN AURIGNACIAN AND CASTELPERRONIAN LEVELS OF ST. CESAIRE (CHARENTE MARITIME)

Analysis of microdebitage from flint knapping experiments is combined with analysis of microdebitage from sediment samples from Aurignacian and Castelperronian levels at La Roche a Pierrot, Saint Cesaire (Charente Maritime). Spatial and temporal variation in microdebitage characteristics is examined in light of spatial and temporal variation in debitage and retouched tools. The utility of microdebitage analysis as an added dimension in Paleolithic studies of chipped stone is presented in a methodological framework, and site formation processes relating to the spatial consideration of tiny flint chips in cave and rockshelter contexts are explored.

Bailey, Douglass W. (Cambridge)

[34] INVESTIGATING VALUE SOCIALLY IN THE PREHISTORY OF NORTHEASTERN BULGARIA

The Chalcolithic Period in northeastern Bulgaria is well known for its fantastic finds of gold and spondylus grave goods in the Varna cemetery. This paper argues that the societies which produced such "sensational" finds may be examined along related and other dimensions, such as spatial patterning, display, consumption and disposal of material goods. Investigations along such dimensions allow one to create a more rigorous and critical interpretation of the fourth millennium B.C. society in northeastern Bulgaria.

Baker, B. J. (see Kealhofer, L.) [55]

Baker, Barry W. and Brian S. Shaffer (Texas A&M)
[43] HUMAN SUBSISTENCE BASED ON VERTEBRATE FAUNAL REMAINS RECOVERED FROM 41HR273 IN HARRIS COUNTY, TEXAS

Faunal remains recovered from an Early Ceramic hunter-and-gatherer site along the western margin of the Austroriparian biotic province reflects a prehistoric subsistence strategy emphasizing large mammal exploitation, predominately deer. In addition, a large number of turtle remains recovered from the site suggest turtles represented an important dietary supplement. A total of nineteen individual genera were identified, including fish, reptiles, birds and mammals. This pattern of faunal utilization is in marked contrast to patterns documented for hunter-and-gatherer populations occupying the eastern margin of the Tamaulipan biotic province to the west.

Baker, Patricia H., Robert I. Birnie and Thomas R. Baker (Maine-Farmington)
[77] PRELIMINARY PHASE I RESULTS OF THE HVDC TRANSMISSION TIE TO HYDRO-QUEBEC FROM SOUTH-CENTRAL MAINE TO THE U.S.-CANADIAN BORDER

Preliminary results are presented of the phase I survey of the 145-mile-long HVDC transmission tie to Hydro-Quebec. This transmission line extends from south-central Maine to the U.S.-Canadian border in northwestern Maine. The most interesting research aspect of this project is that much of the transmission line parallels the Androscoggin River and crosses many of its tributaries. This has given us the opportunity to study the smaller, more ephemeral types of sites present in upland settings. A total of 37 definite or tentative sites have been located through the Contact and Historic periods.

Baker, P. H. (see Torrence, C. M.) [77]

Baker, Thomas R. and James B. Petersen (Maine-Farmington)
[77] PRELIMINARY RESULTS OF THE RUMFORD FALLS PROJECT PHASE I SURVEY, RUMFORD, MAINE

A phase I survey of the Rumford Falls project area flanking the Androscoggin River near Rumford, Maine has resulted in the identification of 25 archaeological sites. This portion of the Androscoggin River Valley exhibits much geological variability and very complicated stratigraphic sequences, making it necessary to use a combination of techniques to identify sites, including traditional test pit strategies and other forms of deep testing. Preliminary results of the study are presented and suggestions are offered on how to conduct surveys in similar riverine settings in the future.

Baker, T. R. (see Baker, P. H.) [77]

Baker, T. R. (see Paquin, C. P.) [77]

Ball, Joseph W. (San Diego State) and Jennifer T. Taschek (Oregon)
[11] SMALL SITE ARCHAEOLOGY AND CLASSIC POLITICAL ORGANIZATION: THE MOPAN-MACAL TRIANGLE PROJECT

Fundamental to any effective attempt to elucidate Classic Maya political organization are accurate assessments of the functions performed by specific individual centers and of the organizational relationships formerly existing among them. Smaller centers offer the potential for large proportion sampling of multiple populations in establishing and verifying hypothetical functions and relationships. Extensive stripping excavations at several contemporary centers in the upper Belize Valley have made possible a tentative reconstruction of local community structure and political organization during the Late Classic period. This paper describes the research strategy and findings to date on the Mopan-Macal Triangle Archaeological Project and suggests a decentralized or "segmentary state" model for Late Classic Lowland Maya political organization.

Bamforth, Douglas B. (Nebraska)

[13] STONE TOOLS AS STONE TOOLS: THE IMPORTANCE OF UTILITARIAN CONSIDERATIONS IN LITHIC ANALYSIS

Recent research has substantially expanded the range of substantive and theoretical insights which archaeologists can obtain from lithic analysis. However, much of this research has neglected 1) the theoretical importance of the fact that stone tools were made to accomplish everyday tasks and not to provide data for archaeologists, and 2) the practical requirements of taking account of these tasks, whether we rely on intensive microwear analysis or not. This paper shows how this perspective changes the conclusions of two recent theoretical studies and presents experimental and archaeological data indicating some of the technical requirements of integrating it into our research.

Banker, S. (see Feinman, G.) [29]

Banning, Edward (Toronto) [Discussant 59]

Bar-Yosef, Ofer (Harvard) and Lillianne Meignen (Centre Recherches Archeologiques)
[24] LEVANTINE MOUSTERIAN VARIABILITY IN THE LIGHT OF NEW DATES FROM QAFZEH AND KEBARA CAVE

Recent dates from Mousterian Sites (Qafzeh and Kebara caves, Israel) enable us to construct a new chrono-stratigraphy for the Levantine Middle Paleolithic and to suggest a reinterpretation of Mousterian lithic technological variability. The contemporaneity of *Homo sapiens sapiens* and *Homo sapiens neanderthalensis* in this region associated with Mousterian industries, similar mortuary practices, use of ochre, etc. indicates that there is no direct relationship between the two human morph-types and their cultural attributes.

Bar-Yosef, O. (see Belfer-Cohen, A.) [51]

Barber, Michael B. (USFS-Jefferson)
[76] PREHISTORIC RESOURCE UTILIZATION OF THE BLUE RIDGE: THE ARCHAEOLOGY OF THE JEFFERSON NATIONAL FOREST

Cultural resource management work on the Jefferson National Forest of Virginia has inventoried a large number of prehistoric sites relating to varied time periods and functions. The change in resource utilization patterns through time in the Blue Ridge Province is examined. A major focus rests with the interpretation of lithic concentrations and their utility in providing information concerning local prehistory.

Barr, Shirley Jo (Portland State)

[40] BLOOD FROM STONES: BLOOD RESIDUE ANALYSIS OF THE DIETZ SITE CLOVIS ARTIFACTS

A method for analyzing blood residues on stone tools has been used on the Dietz site Clovis artifacts from southern Oregon. The method, cross-over electrophoresis, was adapted for archaeological application from its original use in forensic medicine by Margaret Newman of Calgary, Canada. The method has the potential to determine the type of animal, at approximately the Family level, on which a stone artifact has been used. A brief explanation of the methodology and an overview of the results from the Dietz site artifacts is described. Problems encountered with the methodology and its potential for archaeology are also discussed.

Barton, C. Michael (Arizona State), Deborah I. Olszewski (Arizona) and Nancy R. Coinman (Arizona State)

[13] BURINS: TOOL OR TECHNIQUE?

A quantitative study of the morphology of burins from three Upper Paleolithic sites in southwestern Asia permits a reexamination of the functional significance of this class of lithic artifacts. Results suggest that "burination," rather than being primarily a technique for creating graving tools, may simply be an efficient means of altering flake or blade edges for a variety of purposes that include resharping, blunting, hafting, and preparing microblade cores in addition to making "burins" in the classic sense. As burins are one of the most common Upper Paleolithic tool forms, this has important implications for interpreting assemblages.

Basa, L. A. (see Heckenberger, M. J.) [19]

Basa, L. A. (see Petersen, J. B.) [19]

Bassett, E. J. (see Rogge, A. E.) [45]

Bauer, Brian S. (Chicago)

[42] ANDEAN MOIETIES: AN ARCHAEOLOGICAL PROSPECTIVE

The reproduction of dual systems of social organization at all levels of social hierarchies in the Andes, from rural communities to imperial realms, suggest that moiety systems are core principles of Andean society. The Late Inca social organization of the Pacariqtambo region will be presented and will serve as an archaeologically and ethnohistorically grounded baseline through which the study of moieties and rural organizations can be extended into the Late Intermediate Period. In this way the study provides a means to examine the social organization of the area before the development of the Inca Empire.

Bawden, Garth (New Mexico)

[72] TAYMA AND COMMERCIAL ECOLOGY IN FIRST MILLENIUM B.C. ARABIA

The Iron Age oasis occupation at Tayma in northeastern Arabia is discussed as an important commercial center outside the political control of empire, but solidly within its wider economic sphere. Recent archaeological discoveries shed much light on Taymanite emulation of imperial powerfacts to further local elite interests, and on the fluctuating balance of power within northwest Arabia. Presentation of this work in its historic context demonstrates the changing forms of imperial control over peripheral areas in response to changing conditions of interregional exchange in a region of strict ecological limitations.

Beaudry, Mary C. (Boston)

[16] THE SPENCER-PIERCE-LITTLE HOUSE AND LANDS IN TIME AND MIND

The study of the Spencer-Pierce-Little property, approximately 230 acres of fields, marsh, and homelot in Newbury, Massachusetts, involves an integrated, interdisciplinary approach to changing land use over time. This paper presents the outlines of that approach and discusses how information derived from modern vegetational and landscape surveys, archaeological and aerial reconnaissance, documentary research, and remote sensing contributes to land use history of the site. This in turn is combined with the subjective element of local lore about the house and grounds and the people who worked and lived there. The resulting picture of changes in the land corresponding to changes in perceptions of the land aids in interpreting the ways in which New Englanders created a mosaic of cultural landscapes that were at once utilitarian and symbolic.

Beck, Lane Anderson (Peabody Museum)

[55] ETHNIC BOUNDARIES AND THE COPENA MORTUARY COMPLEX

The Copena mortuary complex of northern Alabama was defined originally by a trait list of burial attributes. The attributes ranged from general factors such as burial in mounds to highly specific and rare traits like the inclusion of copper reel-shaped gorgets. Recent analysis of the 50 excavated Copena mounds has redefined Copena. The pattern of mortuary practices revealed through this research suggests that Copena incorporated two distinct socioideological entities which were geographically, and perhaps temporally, separated. The approach utilized in this analysis may prove of use elsewhere for the identification of ethnic boundaries within the archaeological record.

Beckes, M. R. (see Schneider, K. A.) [63]

Belcher, William R. (Maine)

[19] PREHISTORIC FISHING STRATEGIES IN EAST PENOBSCOT BAY, MAINE: THE KNOX SITE AND SEA-LEVEL RISE

The faunal remains of the Knox Site demonstrate a shift in fishing strategies in response to sea-level rise. Initial occupation occurred during the Early Ceramic Period (2,700-2,000 B.P.) when sea level was about two meters lower than today. Dominant fish include sculpin, a mudflat dweller most easily harvested with a brush weir. The major occupation of the site occurred during the Middle Ceramic Period (1,600-1,200 B.P.). Between 2,000 and 1,000 B.P., mean sea level was one meter lower than today. Shoals and mudflats surrounding the Knox site during the Early Ceramic Period were inundated. Atlantic cod is the dominant fish during this period, which can be caught in deep water with hook and line. Sea level rose to its modern level and caused the abandonment of the Knox Site as a fishing locale.

Belfer-Cohen, Anna (Hebrew) and Ofer Bar-Yosef (Harvard)

[51] NON-ARTIFACT REMAINS FROM THE LEVANTINE UPPER PALEOLITHIC

In spite of considerable progress in the study of the Levantine Upper Paleolithic in recent years, certain aspects are still poorly known. Sequences of lithic industries are well documented from both the desert regions and a few cave sites. However, aspects of subsistence and symbolic behavior are hardly discussed due to poor conditions of preservation in the arid zones and the fact that most caves were excavated in the 1930's. The available non-artifactual evidence from the Levantine cave sites (such as settlement patterns, ornaments, use of ochre, and human remains) is explored in order to present new questions concerning the understanding of local Upper Paleolithic cultures.

Belknap, D. (see Bourque, B. J.) [77]

Bell, James A. (South Florida)

[65] SOCIAL VISIONS AND THE MAKING OF DECISIONS IN THE GLOBAL HABITAT

Proposed solutions to global problems normally entail decisions to alter technology, economy, institutions, or life style. An unavoidable problem is how to make long range policy decisions within the parameters of individual rights and prerogatives. The two traditional approaches are guided by different visions of man and social forces: the holistic and individualistic visions. The holistic approach gives minimal attention to individual rights and prerogatives but risks compromising effective policy. An eclectic model mollifies some short comings of each, and is useful in archaeological theory as well.

Benson, J. R. (see Lewarch, D. E.) [70]

Benson, Robert (Georgia)

[21] LITHIC RAW MATERIAL FREQUENCY: AN INSIGHT INTO THE MOBILITY PATTERNS OF LATE QUATERNARY HUNTER-GATHERERS IN SOUTHERN SOMALIA

Archaeologists have proposed that changes in hunter-gatherer mobility patterns across the Pleistocene/Holocene boundary may relate to significant environmental changes. Recent research in Ethiopia and Somalia indicates that the environment changed from a cool and dry terminal Pleistocene climate to a warm and humid Holocene climate. In response to this change, hunter-gatherers hypothetically contracted their mobility patterns due to significant increases in the abundance and concentration of water, flora, fauna, and other critical resources. Focusing upon lithic raw material distribution and use, this paper summarizes recent archaeological investigations in southern Somalia, examining this relationship between environmental and cultural change.

Benz, B. F. (see Long, A.) [39]

Bernstein, David (SUNY-Binghamton)

[68] TRENDS IN PREHISTORIC SUBSISTENCE ON THE SOUTHERN NEW ENGLAND COAST

The results of a long-term research project at the Greenwich Cove site in Rhode Island and data from other archaeological sites in the Narragansett Bay region suggest that subsistence practices there progressively diversified and expanded over the last 3,000 years of the prehistoric period. Evidence for this trend is seen in faunal (vertebrate and molluscan) and macrobotanical assemblages, as well as the regional palynological and ethnohistoric records.

Bettinger, Robert L. (UC-Davis)

[71] ANTHROPOLOGICAL GENERAL THEORY AND THE UPPER PALEOLITHIC TRANSITION

Of the four general theories of human behavior now contending for attention in archaeology—cultural materialism, neo-Marxism, sociobiology, and dual inheritance—only the last presents an explicitly evolutionary account of the distinctive human activities traditionally of interest to anthropologists. Predicted in that theory as resulting from specific modes of acquiring useful behaviors socially, these activities first appear in the Upper Paleolithic, suggesting a fundamental change in the organization of

cultural systems then. It would follow that the models needed to account fully for the actions of our species may not apply to others in our genus—and vice-versa.

Betts, Alison (British Institute of Archaeology)

[72] PREHISTORIC DESERTIC ADAPTIVE STRATEGIES IN EASTERN JORDAN

Recent survey and excavation in the Black Desert of eastern Jordan illuminate the adaptive patterns of earlier Holocene hunter-gatherer groups in this desertic steppe. Excavation at the small base camp of Duweila in particular allows delineation of seasonal hunting patterns for the PPNB and Late Neolithic, and ties together desert sites with base camps in a strategy of gazelle hunting. This subsistence pattern may be opposed to the "burin sites" of Late Neolithic date, which seem to reflect alternative adaptive strategies oriented around ovicaprid pastoralism.

Bey III, George J. (Tulane) and William M. Ringle (Davidson)

[11] THE PROCESSES OF POLITICAL INTEGRATION: THE CASE OF EK BALAM, YUCATAN

Survey and excavations at the site of Ek Balam, Yucatan, have shown it was one of the major Terminal Classic polities of the northern lowlands. This paper compares data used to argue for levels of political organization at other northern sites with their contexts at Ek Balam. Although Ek Balam may be characterized as a city state, the latter term encompasses a variety of forms requiring further refinement to be useful. We argue that integration of lineages was one of the major processes involved in the evolution of Late Classic polities, and that the manner of their accommodation is reflected in the architecture, settlement patterns, and sculpture of Ek Balam.

Bey III, G. J. (see Peraza, C.) [79]

Biagi, Paolo (Venice) and Renato Nisbet (Naples)

[72] MIDDLE HOLOCENE MARITIME ADAPTATIONS ON THE INDIAN OCEAN LITTORAL OF OMAN

Systematic survey of coastal Oman has revealed the regular presence of shell middens along much of the Indian Ocean littoral, many of middle Holocene date. Excavation and surface examination reveal the maritime adaptations of these communities in terms of location and distribution of population, material equipment, and diet, and opens the question of relationship with alternative inland adaptations. These issues are addressed with particular regard for middens in the Salalah (Dhofar) area in comparison with better known middens near Muscat.

Billman, Brian (UC-Santa Barbara)

[42] LAND, WATER, AND ARCHITECTURE: THE POLITICAL AND ECONOMIC ORGANIZATION OF AN EARLY ANDEAN STATE

The political and economic organization of an Initial Period (1,800-1,200 B.C.) state is examined in light of a recent study of over 70 U-shaped structures from the site of Pampas de las Llamas-Moxeque, Casma, Peru. It has been suggested that these U-shaped structures were used by the elite to organize labor, and collect and redistribute goods. A test of this notion is presented, leading to further definition of a hypothetical model of Initial Period political and economic organization in the Casma Valley. The evolutionary process involved in the formation of the Casma polity is explored.

Binford, Lewis R. (New Mexico)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Binford, Lewis R. (New Mexico) [Discussant 24]

Birnie, R. I. (see Baker, P. H.) [77]

Bishop, Ronald L., Suzanne P. De Atley, Veletta Canouts (Smithsonian) and Alfred Qoyawayma (Salt River Project)

[12] MODELING YELLOW WARE EXCHANGE IN THE "JEDDITO ALLIANCE"

Paste compositional data from yellow wares appearing at sites in the Hopi Buttes-Little Colorado River-Anderson Mesa area of Arizona are compared to compositional groups representing ceramic production at major sites on the Hopi mesas. For example, a number of vessels from the off-mesa site of Homolovi II can be shown to relate to manufacturing techniques employed by potters at Awatovi on Antelope Mesa. Other vessels show paste characteristics that vary markedly from production of ceramics on the Hopi mesas. The significance of these technological similarities and differences is interpreted in the contexts of hierarchically and non-hierarchically organized exchange of materials and information.

Bishop, Ronald L. (Smithsonian) [Discussant 75]

Blackburn, F. (see Williamson, R. A.) [33]

Blackman, James (Smithsonian)

[59] OBSIDIAN EXCHANGE DURING THE HALAF AND URUK IN THE KHABUR DRAINAGE

The Khabur river has long been viewed as a major route linking the resource-rich areas of southeastern Turkey with the Euphrates and beyond. Because of its geological rarity and chemical specificity to source, obsidian has been used to document this exchange. Only a few obsidian samples from three widely scattered sites in the Khabur region have actually been chemically assigned to specific sources. The site of Umm Qseir presents an opportunity for the systematic examination of proposed exchange links and to monitor them temporally through analysis by INAA of selected obsidian samples from Halaf and Late Uruk contexts. Results of this research are presented.

Blake, M. (see Clark, J. E.) [35]

Blakely, Robert L. and Richard Woodworth (Georgia State)

[19] SOCIOCULTURAL IMPLICATIONS OF MORTUARY PATTERNS AND PALEOPATHOLOGY AT A GLACIAL KAME SITE IN VERMONT

Results are presented of a bioarchaeological analysis of six-plus skeletons recovered in the 1960's at the Isle La Motte site in Vermont. Partially described by Ritchie in 1969, the remains consist of three intact and several cremated individuals with "typical" Glacial Kame grave goods. Although the cremated remains exhibit postmortem cuts, they were not fleshed prior to burning. Radiographic analysis of two of the intact individuals revealed lesional activity clearly indicative of disseminated tuberculosis. The cranium of one evidences trephination associated with the lesions. Implications for Glacial Kame mortuary practices and social organization are discussed.

Blakeslee, Donald J. and Kim N. Schneider (Wichita State)

[32] PREHISTORIC SOCIAL ORGANIZATION FROM DENTAL ENAMEL COMPOSITION: A PRELIMINARY STUDY

Prehistoric residence and other behavior can be analyzed using dental enamel composition. Trace elements in enamel reflect subsistence and geographic factors. Since most teeth form in childhood and are stable thereafter, enamel composition reflects childhood environment. In this study, energy dispersive x-ray analysis applied to permanent canines provides data on 11 trace elements. In each of four protohistoric Arikara populations, the variance among adult men is much greater than for women and children. The total pattern indicates that males left their natal village after age 16. This pattern persists through the period covered in Deetz's classic study.

Blanton, Dennis B. (Center for Archaeological Investigations-Southern Illinois) and Frankie Snow (South Georgia)

[40] PALEOINDIAN AND EARLY ARCHAIC OCCUPATIONS AT THE FERONIA LOCALITY IN SOUTH-CENTRAL GEORGIA

A rich record of Paleoindian and Early Archaic occupations has been recovered in south-central Georgia from the surface of sixteen sites lying within an area encompassing only four square kilometers. In-depth analysis of the lithic assemblages from these sites has provided information greatly expanding our knowledge of early habitation in Coastal Plain Georgia and the Southeast at large. The density and diversity of artifacts and sites suggests that this area was a locus of population aggregation. This interpretation is supported through a discussion of toolkit composition, metric attributes, lithic raw materials, and comparisons with other contemporaneous assemblages.

Bleed, Peter and Christopher Schoen (Nebraska)

[54] SALES OUT THE FRONT DOOR, REJECTS OUT THE BACK: PRODUCTION AND DEBRIS AT THE LINCOLN POTTERY WORKS

Excavation of the Lincoln Pottery Works—a firm that made domestic pottery in Lincoln, Nebraska from 1881 until 1904—produced a large collection of imperfect crockery. To investigate the relationship between this production debris and overall patterns of Lincoln Pottery Work's production, the waster assemblage was compared with the assemblage of plaster models from the site and a collection of vessels bought at the factory. These comparisons show that both very simple and relatively complex vessel types are underrepresented in Lincoln Pottery Work's production debris. This research suggests some general principles for the analysis of production debris at ancient or modern industrial sites.

Blomberg, Belinda (Alexandria Archaeology)

[54] SCALE AND CONTEXT IN URBAN ARCHAEOLOGY: FREE BLACK NEIGHBORHOOD FORMATION AND PRESERVATION

The use of a broader scale of analysis in urban archaeology, such as that of neighborhood, is facilitated by archival research. Distinct free black residential areas developed between 1810 and 1850 in Alexandria, Virginia. The recognition of neighborhood formation in relation to socioeconomic rank distinctions within this population has implications for the interpretation of urban processes as well as archaeological sites and their material culture in contexts of the larger whole. Preservation planners concerned with protecting urban archaeological data must also be aware of patterning reflecting differences in scale and context.

Blumenshine, Robert J. (Rutgers)

[47] EVALUATING SIZE AND AGE MORTALITY PROFILES AS CRITERIA FOR DISTINGUISHING HOMINID SCAVENGING AND HUNTING

Size and age profiles of ungulate faunas at archaeological sites add a potentially incisive and independent criterion for distinguishing hominid hunting and scavenging based on skeletal part profiles. Existing uses of animal size and age profiles, however, do not provide adequate documentation of the effects of predator-scavenger consumption on modifying age and size profiles prior to hominid acquisition of carcasses (i.e., scavenging), nor after hominid acquisition and carcass processing (hunting or scavenging). Data from over 250 scavengeable carcasses in the Serengeti of Tanzania are used to evaluate the efficacy of mortality profiles in assessing prehistoric hominid carcass acquisition.

Blumenshine, R. J. (see Selvaggio, M.) [43]

Bogucki, Peter (Princeton)

[9] THE NEOLITHIC MOSAIC ON THE NORTH EUROPEAN PLAIN, 4,000-3,000 B.C.

Between 4,000 and 3,000 B.C. (unrecalibrated dates), the North European Plain saw the adaptation of non-indigenous forms of domestic plants and both local and non-local species of livestock to an environment unlike that hitherto encountered by farming populations in the Old World. At the same time, much of this area was occupied by hunter-gatherer populations exploiting the rich lowland environment. The establishment of agricultural communities modeled after those of the loess regions to the south and the eventual emergence of indigenous agrarian communities is explored. A particular emphasis is placed on information obtained from excavations in north-central Poland since 1984.

Bolt, Dianna (UC-Berkeley)

[55] NEOLITHIC CEMETERIES IN SOUTHWESTERN ASIA

While in the Paleolithic period of Southwestern Asia small bands of nomadic hunter-gatherers had shared the benefits of their labors equally among themselves, during the Neolithic groups became larger, more sedentary, began to labor intensively to produce food, and eventually created the institutions of resource ownership and its inheritance, by group or individual family. Growth of habitation group size and change in the means and relations of production caused radical alterations in intragroup relations, resulting in the creation of wealth and rank hierarchies, reinforced by the burial of the dead in bounded cemeteries and distribution of grave goods among individuals.

Bonardi, S. (see Shaffer, G.) [34]

Borns, Harold W. (National Science Foundation-Polar Programs)

[39] PALEOENVIRONMENTS FROM GLACIER ICE CORES

Glaciers and climate are inextricably linked through their paleoatmospheric records. Cores taken from polar ice and lower latitude, high-altitude ice caps provide a record of snowfall. By analyzing their chemistry, isotopic composition and atmospheric fallout including dust, pollen, volcanic tephra and anthropogenic pollutants, we can observe both stratigraphic and radiometric evidence of paleoclimatic and environmental conditions. Ice cores reveal climatic records spanning 150,000 years but highest resolution is possible over the last 12,000 years. Because of this and the rapidly expanding field of ice-core research, a new tool is emerging for the chronologic documentation of environments contemporary with prehistoric peoples.

Borremans, Nina (Florida)

[76] PREHISTORIC MARITIME ADAPTATIONS IN THE CEDAR KEYS

In order to improve our understanding of maritime adaptations and their relationship to prehistoric cultural evolution and environmental change, a simulation model that illustrates the interaction among these components is presented. A multidisciplinary research program on the northcentral Florida Gulf coast incorporates data from a variety of archaeological and ecological projects including

settlement pattern information, stratigraphy, zooarchaeology, nearshore marine ecology, and natural history. Theoretical modeling is necessary to bring together diverse social and ecological variables to understand both strategy and impact of human actions in coastal settings.

Bosinski, Gerhard (Köln)

[2] MIDDLE PALEOLITHIC SETTLEMENT PATTERNS IN WESTERN GERMANY

Evidence from recently excavated Middle Paleolithic sites in Western Germany is reviewed in terms of the character of settlement patterns and the nature of activities undertaken on the sites. Several sites show evidence for repeated occupations, with distinct concentrations of lithic materials, and evidence for the movement of artifacts and raw materials between different sites or regions. In addition to "settlement" locations, there is evidence for specialized "kill" sites (e.g., Lehringen) and raw material extraction sites (e.g., Reutersruh). Evidence for these features is best reflected at open-air sites, which allow a better separation of distinct episodes of occupation than more intensively occupied cave and rock shelter sites.

Bourque, Bruce J., Steven Cox (Maine State Museum), Daniel Belknap (Maine-Orono) and Thomas Lowell (Cincinnati)

[77] CAREY'S GARDEN: A MULTICOMPONENT ARCHAIC SITE ON MERRYMEETING BAY

Carey's Garden lies on the south bank of the Muddy River, an apparently insignificant stream that empties into Merrymeeting Bay. Its location is unusual with respect to other Marine Archaic sites. Its main occupations were between 5,000 and 3,600 B.P., though traces of earlier occupations were encountered. The results of preliminary excavations are presented and various preliminary environmental reconstructions are proposed to explain the site's anomalous situation.

Bousman, C. Britt (Southern Methodist), L. Scott (Orange Free State), N. J. Shackleton (Cambridge) and J. C. Vogel (DEMAST, CSIR)

[67] POLLEN, STABLE ISOTOPES AND PALEOENVIRONMENTAL RECONSTRUCTIONS IN AFRICA

Stable carbon isotopes and pollen analysis provide an additional dimension for paleoenvironmental reconstructions in Blydefontein Basin, South Africa. Matching pollen spectra and $\delta^{13}C$ values from radiocarbon humate samples in geological contexts provide a finer grain analysis than by using pollen or carbon isotopes individually. A second source of carbon isotopes, ostrich egg shell from an excavated rockshelter, provides greater paleoenvironmental resolution, and is directly associated with archaeological materials. Along with assessing human dietary changes via stable isotopes, environmental fluctuations should be obtained and dated, especially in botanically heterogeneous areas or near isotopic ecotones, in order to eliminate background isotopic noise from dietary assessments.

Bowden, M. (see Mees, G. C.) [16]

Boyd, Jr., C. C. (see Boyd, D.) [55]

Boyd, Donna (Tennessee) and C. Clifford Boyd, Jr. (Radford)

[55] EFFECTS OF SUBSISTENCE AND TECHNOLOGICAL CHANGE ON MASTICATORY ANATOMY ACROSS A PREHISTORIC SKELETAL SAMPLE FROM TENNESSEE

Changes in subsistence from hunting and gathering to agricultural and in subsistence-related technology are well-documented across Archaic, Woodland, and Mississippian populations in Tennessee. Effects of these transformations are reflected in the craniofacial, mandibular, and dental anatomy of these skeletal populations. Similar cultural changes in other regions highly correlate with gracilization in these skeletal dimensions over time. Results of this study indicate reduction in some masticatory-related dimensions; however, some unexpected changes do not conform to this gracilization model. A revised, functional model which incorporates both cultural and biological factors is proposed.

Bradley, B. (see Lipe, W.) [12]

Brandt, Steven (Florida)

[8] AN ETHNOARCHAEOLOGICAL STUDY OF FARMER, PASTORAL AND HUNTER POTTERY USE AND MOBILITY PATTERNS IN SOUTHERN SOMALIA

Archaeologists often find it difficult to distinguish prehistoric farming from nomadic pastoralist or hunter-gatherer sites, particularly when stone artifacts, pottery and faunal remains are the only remains recovered. A recent ethnoarchaeological study of pottery use in southern Somalia indicates that significant differences exist, in systemic archaeological contexts, in the type and number of pottery vessels utilized by synchronic/sympatric populations practicing different adaptive strategies. Implica-

tions for the identification of prehistoric modes of production, mobility patterns and the spatial distribution of material culture are discussed.

Brewer, Douglas (Illinois)

[30] CHRONOLOGIES AND PALEOENVIRONMENTS: INCREMENTAL GROWTH STRUCTURES OF THE NILE PERCH (LATES NILOTICUS)

The Nile Perch (*Lates niloticus*), a common food fish recovered from most archaeological sites in the Nile Valley, meets two important criteria for chronological and paleoenvironmental studies. It has a restricted habitat and possesses a suitably long life span. Beginning with a thorough understanding of the natural history of this species and the development of a reliable means to identify annual growth structures, statistical comparisons between series of annuli can potentially lead to the creation of local chronologies as well as provide information on past environments.

Briggs, Peter S. (Utah State)

[75] ARTISTIC AUTONOMY IN THE CENTRAL REGION OF PANAMA, B.C. 250 - A.D. 1100

The common expectation of uniformity of meaning among the artistic expressions of the pre-Conquest peoples of the Central Region of Panama is inaccurate. The lack of parallels in the symbols used for displays of social status contrasts sharply with the technological and stylistic similarity of the mortuary furnishings from several contemporaneous villages in the region. The distinction of socio-functional variation among these mortuary arts is useful, furthermore, because it helps to discriminate among meanings which may be predicted by individual, local, or regional criteria.

Brody, L. (see Guderjan, T. H.) [25]

Brookes, Sam (USFS-Mississippi)

[27] PREHISTORIC EXCHANGE IN MISSISSIPPI 4000 B.C. TO A.D. 1500

Exchange networks were present in Mississippi by 4,000 B.C. The materials being exchanged, other source areas, and the different approaches of exchange are discussed during several time periods.

Brooks, Robert (Oklahoma Archeological Survey)

[32] PLANNED VERSUS UNPLANNED ABANDONMENT OF DWELLINGS: IMPACTS ON THE CONTEXT OF HOUSE FLOORS

Archaeologists have recently begun to study the spatial patterns of artifacts on house floors in order to develop interpretations of domestic behavior. These studies, however, often fail to evaluate factors preceding planned abandonment which distort the contextual integrity of house floor remains. It is argued that the interruption which occurs in unplanned abandonment provides greater detail for interpretation of behavioral activities. An example from south central Oklahoma documents the contrasts that occur in planned versus unplanned abandonment.

Brown III, Marley R. (Colonial Williamsburg Foundation)

[80] STRATEGIES OF STATUS MAINTENANCE AMONG VIRGINIA'S FIRST FAMILIES: THE SYMBOLIC PROPERTIES OF CONSUMER GOODS IN COLONIAL AND POST-COLONIAL VIRGINIA

The problem of how fluid economic hierarchy was transformed into a more orderly social hierarchy during the consumer revolution of the late eighteenth century is examined. Archaeological and historical evidence from Williamsburg, Virginia, is analyzed to illustrate the symbolic properties of consumer goods as vehicles for the maintenance of social rank. Chief among these properties is the quality of "patina": the age of costly objects and duration of their ownership. This symbolic attribute of consumer goods served to transform mere wealth into a verification of social rank during a period when traditional elites found themselves under severe economic and social pressure.

Brown, Alan and Bonnie L. Gums (Southern Illinois-Edwardsville)

[60] THE WEST SIDE STORY: ARCHAEOLOGICAL INVESTIGATIONS ON THE PERIPHERY OF THE CAHOKIA SITE

Archaeological investigations on the western periphery of the Cahokia site, conducted in conjunction with two pipeline construction projects, revealed the presence of occupations dating from the Emergent Mississippian period into the Mississippian period. Results indicate that the most intensive occupation dates from the Lohmann-Stirling time span and that this occupation decreases toward the west. Evidence for specialized activities, in the form of a mortuary complex and a microlithic industry, were also uncovered further documenting the multi-functional nature of this area of the site.

Brown, James A. (Northwestern) (Discussion: 36)

Brown, James A. (Northwestern) (Discussion: 5)

Bruen, E. (see Judge, W. J.) [23]

Brumfiel, Elizabeth M. (Albion)

[18] WEAVING AND COOKING: WOMEN'S PRODUCTION IN AZTEC MEXICO

The archaeology of women's work in the heartland of the Aztec empire is examined. The intensity of textile production is measured by the frequency of spindle whorls in the domestic refuse of five Late Postclassic sites. Patterns of food preparation are revealed in the frequencies of different forms of cooking vessels. These data reveal how the intensity of women's work was affected by the formation of the Aztec state and how women responded strategically to the demands placed upon their labor. In particular, the archaeology of women's work suggests variability and change not suggested by ethnohistoric accounts of Aztec culture.

Bryant, Jr., V. M. (see Sobolik, K. O.) [67]

Bryson, Robert U. (Oregon)

[74] PEER POLITY INTERACTION ON POHNPEI

While many details about the site have become clear, a precise understanding of how the Nan Madol complex interacted with the rest of Pohnpei has yet to emerge. Data derived from mineral and elemental characterization of pottery and clays and from analyses of the patterned distribution of artifacts and architecture are applied to the problem of determining the relationship between Nan Madol and the local polities surrounding it. Renfrew's peer polity interaction model is evaluated for its utility in interpreting available data within the context of the social complexity, interaction, and exchange necessary to support Pohnpei's pre-eminent sociopolitical center.

Buck, Paul E. (Washington)

[17] FORMATION PROCESSES OF OLD KINGDOM DEPOSITS AT KOM EL-HISN, EGYPT

Egyptian archaeologists have directed little effort to examining deposits of Old Kingdom (ca. 2,700-2,160 B.C.) habitation sites. A study of formation processes is described with the deposit as the analytical unit. After an initial classification using field observable attributes, variability within deposit classes is described in terms of differences in artifact density, deposit diversity, and particle size distribution. At Kom el-Hisn this variability provides a means to distinguish high diversity, high density "dumps," from low diversity low density "house-floors." The accretion of these and other classes of deposits allows the depositional history of this Old Kingdom site to be reconstructed.

Buehrig, Jeanette E. (WAPORA, Inc.)

[45] THE GRENADE PIT SITE (12-B-815): A SIGNIFICANT MULTI-COMPONENT SITE AT ATTERBURY RFTA, BARTHOLOMEW COUNTY, INDIANA

The discovery, testing and excavation of a large multi-component prehistoric site is described. It is located on the floodplain of the Driftwood River within the boundaries of the Atterbury Reserve Forces Training Area in Bartholomew County in central Indiana. The site, discovered during a Phase I survey for a natural gas pipeline, has produced cultural material dating from the Early Archaic to the Late Woodland. The most heavily represented component at the site is the Late Archaic Riverton culture.

Bulkstra, Jane E. (Chicago)

[57] A CARBON ISOTOPIC PERSPECTIVE ON DIETARY VARIATION IN LATE PREHISTORIC WESTERN ILLINOIS

Analyses of $\delta^{13}C$ values, associated in the Midwest with maize consumption, have clarified some issues regarding late prehistoric Illinois diets and called others into question. Archaeological and paleopathological research frequently link maize dependence with the rise of population centers, such as Cahokia, and a deterioration of community health. Carbon isotopic values for Illinois River Valley skeletons are contrasted with newly generated data from skeletons from Mound 72 at Cahokia and surrounding sites. Seemingly contradictory data are attributable to the limitations of archaeological measures of prehistoric dietary content, underscoring the importance of secure contextual controls and a sensitivity to interpopulation variation.

Burgi, P. (see Rice, P. M.) [6]

Burke, Ariane Michelle (New York)

[30] CEMENTUM INCREMENTAL STUDY OF EQUIDS

The results of a study of cementum increments are presented based on a control sample of modern horse using polarized light. The applicability of the method of cementum analysis to equids in general and more specifically to fossil equids will also be examined. The control sample comprised mandibular molar and premolar tooth series extracted from animals of known age and season of death. The samples were obtained from the New Bolton Center, University of Philadelphia Veterinary College, from June

1988, until March 1989. Results are compared with a parallel study of cementum incremental structure in horse using scanning electron microscopy.

Burroni, D. B. (see Colten, R.) [34]

Bushnell, Amy Turner (South Alabama)

[44] THE SACRAMENTAL IMPERATIVE: THE RELATIONSHIP OF CATHOLIC RITUAL TO INDIAN SUBSISTENCE AND SETTLEMENT IN THE PROVINCE OF FLORIDA

For the devout Spaniard the Conquest was legitimized by the fact that the natives of the New World were introduced to the salvation-giving sacraments of the Roman Catholic Church. It is argued that considerations of ritual, particularly of access to the sacraments, were what largely determined the patterns of Christian Indian subsistence and settlement in La Florida. The Spanish view that seasonal nomads and non-farming natives must be "reduced" to "regular" villages to live like Mediterranean peasants "under the bell of their doctrina" effectively limited Spanish hegemony to those regions where village-based agriculture was feasible.

C., R. C. (see Cowgill, G. L.) [69]

Caballero, Javier (UC-Berkeley)

[26] MODERN MAYA HOMEGARDENS

A study of 60 homegardens which was carried out in ten different villages from the Yucatan Peninsula, Mexico, shows that 83 different plant species are grown in the Maya homegardens. The plants provide food, medicine, and many other useful products which play an important role in modern Maya subsistence. A significant proportion of these species are wild or cultivated plants that probably were also important resources for the ancient Maya. Since the tropical forest is rapidly disappearing, modern Maya homegardens constitute a refuge for many species. Modern Maya homegardens provide important evidence and analogies for understanding ancient Maya subsistence.

Cabrera Valdes, V. (C/Senda del Rey s/n. Ciudad Universitaria) and F. Bernaldo de Quiros (Centro de Investigaciones y Museo de Altamira)

[2] APPROACHES TO THE MIDDLE PALEOLITHIC IN NORTHERN SPAIN

Middle Paleolithic variability in Spain should be observed with reference to several points: site characteristics, the relevance of information, the chronological analysis involved and the interpretation of lithic assemblages and faunal remains. The most accurate information comes from cave sites, as they offer a greater spectrum of data. We also try to observe these aspects in comparison with certain Upper Paleolithic stages, keeping in mind that the Final Upper Paleolithic (Magdalenian stages) shows the highest specialization ratio.

Calagero, Barbara Anderson and Anthony R. Philpotts (Connecticut)

[68] RHYOLITE AS A MARKER OF SITE FUNCTION

Tools and flakes of non-local rhyolite and rhyolitic welded ash flow tuff, found in only a few site assemblages from the two river valleys of central Connecticut, provide useful markers of non-local lithic exchange. We propose that the earliest regional center for exchange is a large Middle Archaic period site in Farmington with an abundance of rhyolite and other non-local rock. This site functioned as a center for thousands of years before a second locus of exchange developed in the neighboring Connecticut Valley by the Terminal Archaic period. Following this, rhyolite importation ceased.

Campbell, Amy (Southern Methodist)

[24] THE SIGNIFICANCE OF MIDDLE PALEOLITHIC WATER WELLS AT BIR SAHARA IN THE WESTERN DESERT OF EGYPT

The discovery of Middle Paleolithic water wells in the Western Desert of Egypt represent the oldest known evidence of hydrologic manipulation by humans. These anthropogenic features, found at the Bir Sahara locale in the context of a Denticulate Middle Paleolithic site, clearly represent an adaptive strategy to cope with an area that was at least seasonally without running or standing water. Available evidence suggests a date of no later than the onset of the last glaciation. The ramifications to be considered in such a find include reconstruction of the paleoenvironment of this now hyperarid region, as well as the consideration that early humans were capable at a considerable antiquity of anticipating the need to maintain a dependable water source.

Canouts, V. (see Smith, G.) [63]

Canouts, V. (see Bishop, R. L.) [12]

Carlson, David (Texas A&M)

[52] PATTERN RECOGNITION AND CULTURAL STRATIGRAPHY: AN EXAMPLE FROM EAST TEXAS

The discrimination of cultural and noncultural formation processes is explored in terms of a multicomponent Archaic/Late Prehistoric site in east Texas. The site extends to a maximum depth of 1.6 meters and contains substantial evidence of post-depositional reorganization from rodent burrowing as well as other processes. Exploratory analysis of debris categories such as debitage, burned and unburned rock, and burned clay with multivariate statistical techniques (including cluster and factor analysis) provides a basis for identifying relatively less disturbed cultural strata from deposits which represent vertically and horizontally displaced materials into sterile layers. The interpretation reached through the analysis of debris compares favorably with the distribution of intact cultural features.

Carlson, John (Maryland)

[78] THE DIVINE KING: THE MAYA GOD C AS THE PERSONIFICATION OF K'U-DIVINITY, SPIRIT AND THE SOUL RESIDING IN THE BLOOD

The ubiquitous Maya God C has been an enigma since it was first identified and discussed by Schellhas in 1904. In the literature, God C has usually been identified erroneously with the North Star. Based on the discovery that San Diego de Landa's informant used the head of God C as the phonetic complement, *k'u*, in the glyph for the month Cumku in Landa's unpublished manuscript copy, it is proposed that God C functions both phonetically as *k'u* in Maya writing (*ch'u* in Chollan languages), and in its root meaning of *K'u*, *K'u'l* and *Ch'u'l*—the embodiment or personification of the Maya concept of god, divinity and the soul. God C was employed in titles such as emblem glyphs by the Maya Lords to identify themselves as the divine descendants of ancestral gods through the direct inheritance of the *Chu'el* soul or divine essence which resides in the blood. This is the real meaning of Maya bloodletting, blood sacrifice and scattering rites.

Carmean, Kelli (Pittsburgh)

[4] VESSEL FORM, STRUCTURE FUNCTION, AND SOCIAL ORGANIZATION AT SAYIL, YUCATAN, MEXICO

Household differentiation is investigated through the relationship of ceramic vessel form, structure function, and social status. The data suggest that different social groups perform qualitatively different activities, tasks, and functions which are reflected archaeologically in different structure types and ceramic forms. The site-wide pattern of such differentiation is used to understand the social organization of the Terminal Classic (A.D. 800-1000) site of Sayil, Puuc Region, Mexico. Ceramic form data from structure-specific surface collections from the 1988 field season at Sayil forms the empirical basis of this research.

Carr, Bob (Dade County)

[33] DETERRENENTS TO SITE VANDALISM IN URBAN SETTINGS: THE MIAMI EXAMPLE

Destruction of archaeological sites in the urban settings is commonplace and often taken for granted as a social component of the changing cultural landscape. Often overlooked, however, is vandalism of sites in the urban setting and this does not have to be a part of urban change. Through progressive interaction with various publics, the Dade County historic preservation program has reduced site destruction threats from commercial expansion, vandalism and artifact collecting.

Carr, Christopher (Arizona State)

[14] CERAMIC TEMPER CHARACTERIZATION WITH RADIOGRAPHY AND PETROGRAPHY

Analysis of the temper in ceramic vessels is useful in studies of vessel function, chronometry, and exchange. Key variables, including the fractional volume of all temper particles or particles of certain mineralogical or size classes, particle size distribution, and approximate material/mineralogy can be estimated reliably from large volumetric samples using x-radiography. Analogies to BSEM mineral identification are discussed. Petrography provides more detailed mineralogical information but may not allow reliable estimates of all of the variables for lack of adequate sample volumes. Dimensional analyses of Ohio Woodland sherds illustrate this. The complementary uses of x-radiography and petrography provides a solution.

Carr, H. Sorayya (Oklahoma Conservation Commission)

[26] PATTERNS OF EXPLOITATION AND EXCHANGE OF SUBSISTENCE GOODS IN LATE CLASSIC-EARLY POSTCLASSIC YUCATAN: A ZOOARCHAEOLOGICAL PERSPECTIVE

The ongoing analysis of faunal samples from Chichen Itza and Isla Cerritos, Yucatan, provides a picture of animal exploitation in two contemporaneous communities that differed in ecological setting and economic role. At both sites, the presence of non-local animal remains signals the movement of

subsistence goods between coastal and inland locations. More importantly, data such as anatomical part representation reveal evidence for specific characteristics of this exchange pattern, while also illustrating some of the methodological difficulties of documenting such exchange. This regional perspective on animal exploitation patterns contributes to our understanding of the overall economy of northern Yucatan.

Carrell, Toni (National Park Service)

[38] ETHICS VS. COMMERCIAL EXPLOITATION: WHAT'S IT WORTH TO THE FUTURE?

...a private archaeological contracting firm is approached, because of its in-house capabilities, to publish the results of several years work on a shipwreck site by a treasure salvage company. ...a state-sanctioned treasure salvage program requires that the contractor hire a professional archaeologist to conduct the project. The majority of the artifacts will be sold and the collection disbursed, although a "sample" will eventually be donated to a museum for a tax deduction. Is the collection of even limited data about a site, or the dissemination of information from exploitative field work ethically defensible? How will future generations evaluate our actions and what value will they place on the loss of these sites for personal, private, or corporate profit?

Chase, Philip G. (Pennsylvania)

[24] MIDDLE PALEOLITHIC SUBSISTENCE PATTERNS IN SOUTHWEST FRANCE: THE COMBINED EVIDENCE OF FAUNAL REMAINS AND LITHIC RAW MATERIAL SOURCES

It is difficult to determine how Middle Paleolithic peoples made their living, because different subsistence strategies may leave identical zooarchaeological records at the site level. Complete systems cannot be reconstructed because we cannot correlate different sites on a finer than geological time scale. However, lithic raw material analyses have linked sites to other locations in the landscape without requiring chronological correlation. The combined use of such studies with faunal data permits inferences concerning patterns of human movement, of randomness versus specialization of activity, and of the functional equivalence or complementarity of sites in the Middle Paleolithic of southwestern France.

Chavez, Karen (Central Michigan)

[29] TRADITIONAL POTTERY PRODUCTION AND DISTRIBUTION IN SOUTH HIGHLAND PERU: IMPLICATIONS FOR ARCHAEOLOGY

Villages in the lower valleys specialize in the production of containing and serving vessels, but do not produce the fire-resistant pots that high elevation villages make. Such village specialization of functionally complementary forms requires their distribution, assures interaction, and maintains interdependency between the two ecozones. Pots are exchanged for agricultural produce from both zones. Production and distribution occur primarily during the dry season when conditions are more favorable, when such activities do not conflict with agricultural production, and when fairs occur. In Cuzco the family is the pottery production unit, men and women specializing in different forms, and intra-village distribution also occurs. Pottery enters a regional system of distribution through the fairs scheduled by a religious (Catholic) calendar.

Ciarla, Roberto (Istituto Italiano per il Ed Estremo Oriente), Andrew D. Weiss (MASCAPennsylvania) and Mauro Cremaschi (Centro di Studio per la Stratigrafia e la Petrografia)

[3] DEVELOPMENT OF SOCIAL COMPLEXITY IN CENTRAL THAILAND: COMMUNITY GROWTH AND CHANGE AT BAN THA KAE

Mapping, surface survey, and geoarchaeological investigations along quarrying cuts at the site of Ban Tha Kae, a one square kilometer mound in central Thailand, have revealed the large scale internal structure of a key site during the Pre-Iron, Iron Age, and Davaravati periods. Preliminary analyses of the spatial distributions of cultural remains and geoarchaeological features show growth in the overall size of the site, along with changes in the types of activities and contexts present during each period. These results show how a probable regional center evolved during the period of emerging social complexity bracketing the first millennium B.C.

Claassen, Cheryl (Appalachian State)

[7] THE INTERPRETIVE CRISIS IN SHELL MIDDEN ARCHAEOLOGY

Several assumptions and practices by archaeologists excavating shell bearing sites seriously skew our interpretations. The failure to incorporate experimentation and ethnoarchaeology as research tools has likewise hampered interpretations still further limited by our own experiences. In this paper I 1) take issue with the standard assumption that all contacts in shell bearing sites are human dietary debris, drawing on my observations in the Bahamas. 2) question the validity of much of dietary reconstruction

objecting that sample sizes either excavated or analyzed are woefully inadequate for the task, and 3) specify that the methods of calculating meat values, seasonality and habitats are grossly simplistic.

Claassen, Cheryl (Appalachian State) [Discussant 30]

Claggett, Stephen (Office of the State Archaeologist-North Carolina)

[38] SOMEONE IS ALWAYS GOING TO BE UNHAPPY WITH MY DECISIONS: A STATE ARCHAEOLOGIST'S PERSPECTIVE ON ETHICS AND PUBLIC ARCHAEOLOGY

Professional standards can be difficult to reconcile with public expectations about what SHPO staff archaeologists should be doing (or not doing) in any given case of archaeological resource protection. State Archaeologists often find themselves employing "archaeological triage" decision-making techniques; yet, despite what some critics think, decisions are never made in a political or ethical vacuum. Effective resolution of real-world problems of site protection or destruction demands ethical policies and professional archaeological politics, plus media and public diplomacy skills. Staffing levels, budgets, and moral support from fellow archaeologists are additional factors in the equation. Case studies from North Carolina illustrate some of the realities of balancing professional mores with political and economic development pressures.

Clark, Geoffrey A., John Lindly and Nancy R. Coinman (Arizona State)

[24] CONTINUITY OR REPLACEMENT? MIDDLE AND UPPER PALEOLITHIC ADAPTATIONS IN THE LEVANT

Any general explanation for modern human origins must reconcile fossil and archaeological evidence, and evidence from molecular biology. Levantine data are paradoxical in this regard since the Levant has produced alleged "morphologically modern humans" TL-dated at ca. 92,000 B.P. at Qafzeh in association with Mousterian archaeological assemblages indistinguishable to those also found with alleged "neanderthals." Levantine Middle and Upper Paleolithic adaptations are outlined and contrasted in order to determine if there is any evidence for the discontinuity implied by the biological replacement models of Vandermeersch, Bar-Yosef and others. The implications of biological replacement are discussed, along with issues in molecular biology. Biological replacement of archaic *Homo sapiens* with morphologically modern humans is not supported by the sparse fossil evidence, nor the abundant archaeological evidence. Biological replacement is also contradicted by all but one construal of the controversial mtDNA data.

Clark, Geoffrey A. (Arizona State) [Discussant 72]

Clark, John E. (Brigham Young) and Michael Blake (British Columbia)

[35] THE EARLY FORMATIVE SEQUENCE AT CHIAPAS, MEXICO

The chronology and artifact sequence for the Early Preclassic period on the Pacific coast of Chiapas, Mexico is described. The new radiocarbon chronology is based on 30 dates from recent excavations in the Rio Coatan region of southern Chiapas and recalibrations of 25 dates from previous research in the area. We outline a sequence of archaeological phases based on these dates and the recent analysis of the ceramic and artifact collections from our 1985 excavations. Special attention is paid to the ceramic typology and the evolution of early Formative ceramics in the context of emerging chiefdoms.

Clark, P. (see Fitzhugh, W. W.) [50]

Clay, R. Berle (Office of the State Archaeologist-Kentucky)

[5] CHANGING ADENA MORTUARY PRACTICES

Building on an understanding of Adena mortuary practices developed from the excavation of the Kirk and Newman mounds and the Niebert mortuary camp at Gallipolis Lock and Dam, West Virginia, changes in mortuary practices through time are hypothesized. These draw on materials from later Adena sites in the Kanawha Valley, Kentucky, and the Mid-Ohio Valley. It is suggested that through time there is a wide spread development in the importance of fineage mortuary facilities. This trajectory of change is then related to patterns of Hopewellian mortuary practice which followed in the Ohio Valley.

Cleghorn, Paul L. (Bernice P. Bishop Museum)

[74] STONE ADZES: HARD COMMODITIES FOR INTERACTION STUDIES IN THE HAWAIIAN ISLANDS

The stone adze was the most important woodworking tool in precontact Hawaiian society. Raw material for this important class of tools was non-randomly distributed across the island landscape, and was generally exploited in localized quarry locations. An argument is made that this limited resource was controlled by a developing elite and was used as a commodity in interaction spheres. A

model, based on the size, date of use, and location of the quarries, is presented that predicts the flow of adzes in precontact Hawaiian society.

Cleland, Charles E. (Michigan State Museum) [Discussant 38]

Cleland, James (Dames and Moore)

[45] MULTI-STAGE RESEARCH IN THE SITING AND ASSESSMENT OF LINEAR PROJECTS

Appropriate approaches to archaeological studies in support of the siting of linear projects remain an unresolved issue in historic preservation planning. There is tremendous variation from project to project and jurisdiction to jurisdiction in the degree to which archaeological information is factored into the initial identification of project alternatives. Similarly, approaches to the assessment of impacts along alternative corridors varies considerably. Controversies regarding the appropriate role of predictive modeling and sample surveys contribute to the lack of clear direction amongst professional archaeologists. Many archaeologists are only vaguely aware that the requirements of the National Environmental Policy Act are substantially different than those of the National Historic Preservation Act. The Geothermal Public Power Line project in northern California is reviewed as an example where a multi-stage archaeological research strategy, encompassing predictive modeling, sample survey, and intensive survey, was utilized at various planning stages. Using Geographic Information Systems provides improved ability to relate corridor level data to the understanding of regional settlement patterns.

Clemens, H. S. (see Johnson, I. R.) [48]

Clermont, Norman (Montreal)

[19] WHAT DO YOU DO WHEN YOU ARE OUT OF BOUNDS? AN ANALYSIS OF ARCHAIC-WOODLAND PERIOD BOUNDARIES IN QUEBEC

Southern Quebec has recently provided new data which enable extensive discussion and revision of key taxonomic concepts in regional prehistory. These new data have been unexpected since few scholars have ever considered southern Quebec as a full participant in regional interaction networks in the Northeast. Some of these new data are summarized and a revised outline is given of the Late Archaic through Middle Woodland cultural boundaries for this region.

Cleuziou, Serge (CNRS)

[72] THE BEGINNING OF OASIS LIFE IN EASTERN ARABIA: A CASE STUDY FROM HILI (UAE)

Recent excavation in the Omani piedmont has demonstrated that oasis farming—an artificially created environment that includes sophisticated irrigation systems and creation of shade with palm trees—was already developed in eastern Arabia around 3,000 B.C. The aggregation of the multiple foreign cultivars that produced a subsistence system capable of sustaining not only local farmers but also a wider network of pastoralists, fisherfolk, and specialized producers (notably of copper) is investigated. The site of Hili is taken as an example of these critical transformations in the shaping of the Arabian way of life.

Cochran, Donald R., Kris D. Richey and Lisa A. Maust (Ball State)

[64] EARLY PALEOINDIAN ECONOMIES IN THE GLACIATED REGIONS OF INDIANA

Analysis of over 100 fluted points from central and northern Indiana has allowed the formulation of models for Early Paleoindian economic systems present within the till plain and lake and moraine regions of the state. Correlations between local chert sources and fluted points, together with locational analysis of fluted point sites, suggests differential patterning between the two regions and provides new data for interpretation of existing models of Early Paleoindian economies.

Coinman, Nancy R. (Arizona State)

[81] REFIGURING THE LEVANTINE UPPER PALEOLITHIC

Recent interest in the Upper Paleolithic of the Levant has focused on the identification of two partially contemporaneous "traditions" or "techno-complexes"—the Ahmari and the Levantine Aurignacian. Criteria currently used to identify these lithic assemblage types, however, are less clearly defined and inconsistent in terms of their typological and technological features. Lithic data from Jordan are used to examine the validity and general applicability of these suggested assemblage types on a larger, pan-Levantine scale. A comparison of the two assemblage types is made in order to define more explicitly differences and similarities that are claimed to distinguish them.

Coinman, N. R. (see Clark, G. A.) [24]

Coinman, N. R. (see Barton, C. M.) [13]

Collins, James M. (Office of the State Archaeologist-Iowa)

[32] THE PERSPICUOUS ART OF PAPER ARCHAEOLOGY: A CAUTIONARY TALE

An exercise that began with a routine site records check for an Iowa Department of Transportation funded Cultural Resource Management project resulted in the documentation of a calamitous series of problems spanning the work of five generations of archaeologists. The consequences of fundamental recording errors, as reflected in published literature and the management of significant resources, is described. An object lesson is obtained in the need for vigilance regarding precise provenience data, and cautions against the continuation of the archaeological cold war.

Collins, J. M. (see Mehrer, M.) [36]

Colten, Roger (Lompoc Museum), Daniela B. Burrioni (Universita di Siena), Randolph E. Donahue (SUNY-Stony Brook) and Christopher O. Hunt (Cambridge College of Arts and Technology)

[34] PALEOLITHIC RESEARCH IN THE FARMA VALLEY, TUSCANY, ITALY

Site survey in the Farma Valley has revealed a high density of late Pleistocene and early Holocene sites. Interdisciplinary research at one of these sites, Petriolo III South, has produced data that shed light on site formation, structure and function, as well as paleoenvironmental conditions. Preliminary results of spatial analysis, palynology and sedimentology suggest a short term summer occupation by a small group of Mesolithic hunters and gatherers exploiting locally available jasper for maintenance of curated technology. These regional and site specific data can be used for evaluating settlement models for prehistoric central Italy.

Conkey, Margaret (UC-Berkeley)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Conrad, Geoffrey W. (Indiana)

[6] DOMESTIC ARCHITECTURE OF THE ESTUQUINA PHASE: ESTUQUINA AND SAN ANTONIO

Estuquina and San Antonio are two Estuquina-phase (A.D. 1200-1500) sites in the Osmore drainage. They lie within 15 kilometers of one another and share similar ceramic styles, mortuary patterns, and other characteristics. However, the domestic architecture at the two sites is very different in terms of the internal partitioning of individual house structures, subdivisions of the site, and overall community patterning. The domestic architecture of the two sites and its implications for household composition, site function, sociopolitical organization, and ethnicity are discussed.

Conrad, G. W. (see Rice, P. M.) [6]

Cordell, Linda (California Academy of Sciences) [Discussant 18]

Cottier, J. W. (see Sheldon, C. T.) [76]

Cowgill, George L. (Brandeis), Ruben Cabrera C. (INAH) and Saburo Sugiyama (Brandeis)

[69] SOME IMPLICATIONS OF MASS HUMAN SACRIFICE AT TEOTIHUACAN, MEXICO

Until recently there was no evidence for large-scale human sacrifice at Teotihuacan. However, since 1982 multiple burials containing 40 individuals have been found on the south and north sides of the Temple of Quetzalcoatl. In 1988 more were found east of the pyramid, and a tunnel encountered multiple burials within the pyramid itself. By now about 80 individuals sacrificed when the pyramid was built are known, and the total is surely much higher. Most are males with rich military attire and warlike offerings. We discuss implications of these and other new finds for Teotihuacan warfare, religion, and politics.

Cowie, Ellen R. (Maine-Farmington)

[77] RECENT INVESTIGATIONS IN THE CENTRAL ANDROSCOGGIN RIVER VALLEY, MAINE

Survey and testing projects conducted between 1986 and 1987 along the margins of the Gulf Island head pond in the central Androscoggin River Valley provide data on riverine cultural adaptations during the Holocene epoch. Based on radiocarbon dated features and diagnostic artifacts the twenty-nine aboriginal sites range in age from the Early Archaic period through many of the subsequent cultural periods in prehistory and history. Two stratified sites preserve a cultural sequence from 8,000 B.P. onward. Site locations, geomorphological settings, stratigraphy, cultural features, and artifacts are discussed to provide an overview of aboriginal occupation of the central Androscoggin drainage valley.

Cox, S. (see Bourque, B. J.) [77]

Crane, Cathy (Southern Methodist)

[26] THE PALYNOLOGY AND ARCHAEOBOTANY OF CERROS, BELIZE

The Cerros archaeobotanical remains document changing patterns of plant utilization during the Late Preclassic occupation of this site. By stage four there was a decline in the utilization of maize and an increase in the consumption of probable imported tree crops. These changes may have been the result of the Cerrosanos' participation in regional trade and the development of a central market place at the site. The Cerros pollen record documents a gradual deforestation of the site which correlates with the growth of the site and the relocation of a large segment of the population necessitated by the construction of the ceremonial center.

Cremer, W. (see Habicht-Mauche, J. A.) [53]

Creel, Darrell (Texas)

[55] CREMATION IN MIMBRES MOGOLLON MORTUARY PROGRAMS

Crementation was a rare form of mortuary treatment during the Late Pithouse and Classic periods in the Mimbres area. During these periods (ca. A.D. 550-1150), cremations were interred in special rooms or in special areas within the community proportionately more often than were inhumations; and cremations were much more likely to have projectile points accompanying them. These facts and the rare occurrence of cremation during these periods are perhaps most easily attributed to unusual conditions of death, although the extant data do not permit a wholly satisfactory evaluation of this possibility.

Cremschi, M. (see Ciarla, R.) [3]

Crothers, G. M. (see Riggs, B.) [52]

Crumley, Carole L. (North Carolina)

[65] THE ROLE OF REGIONAL-SCALE ANALYSIS IN CLIMATIC CHANGE

An important component in any definition of region is its climate, and the prospect of global climatic change renders previous static definitions (both physiographic and cultural) inadequate. A temporally and spatially dynamic definition of region, based on the area's ecological history, is proposed. Among several advantages, the utility of a dynamic concept of region lies in its ability to focus global climatic changes of a scale comprehensible to most people and roughly commensurate with extant institutions. Archaeology and related fields amass the information necessary to construct regional-scale ecological histories and to identify effective coping strategies for the future.

Cruxent, Jose M. (Museo del Hombre-Venezuela)

[22] LA ISABELA 1493: FIRST SPANISH COLONY IN THE NEW WORLD

The settlement of La Isabela was established in northern Hispaniola by Christopher Columbus in the winter of 1493-1494. It was here that the first sustained (post-Viking) interaction between Europeans and American Indians took place, and it was here that the first European animals, plants, and social institutions were introduced to the Americas. Excavations have been conducted over the past two years at the site of La Isabela, directed by Cruxent under the auspices of the Direccion de Parques Nacionales de la Republica Dominicana, and previously under the auspices of the Museo del Hombre Dominicano. The archaeological research at La Isabela, and the insights gained into this first European-American community, is discussed.

Cummings, Linda Scott (Paleo Research Laboratories)

[49] DIET AND NUTRITIONAL STRESS IN TWO ANCIENT CHRISTIAN SUDANESE NUBIAN POPULATIONS: THE COPROLITE RECORD

Forty-eight coprolites were recovered during the course of excavating burials from two cemeteries (A.D. 550-750; A.D. 1400). Phytoliths were recovered from the coprolites, as were pollen, bone, macrofloral remains, and hair. Together, these data bases were integrated to provide as complete a picture as possible of subsistence patterns. This study offers the first opportunity to compare the results of analyses that examine hair for trace minerals, bones for indications of nutritional stress, and coprolite evidence of subsistence in an archaeological population, and to look at the coprolites by age and sex categories.

Curet, Antonio (Arizona State)

[25] SPECIALIZED CERAMIC PRODUCTION AREAS: AN EXAMPLE FROM LA MIXTEQUILLA, VERACRUZ, MEXICO

During regional survey by La Mixtequilla Archaeological Project, areas with unusual amounts of *comals* (Tortilla griddles) were detected. Results of preliminary studies on the original surface collections supports the idea of localized ceramic production associated with residential mounds. A more

intensive and extensive study of the surface assemblage was performed in two of the localities. The results of both spatial and quantitative analysis are presented and compared with surface production assemblages reported for other areas in Mesoamerica. In addition, the case presented will be viewed from the perspective of different models developed for ceramic specialization.

Curren, Caleb and Keith J. Little (Alabama-Tombigbee Regional Commission)

[1] CONQUEST ARCHAEOLOGY OF THE ALABAMA COASTAL PLAIN

Documentary evidence derived from sixteenth century Spanish explorations and colonization attempts provide intriguing bits of data concerning the socio-political organization and geopolitical boundaries of late Mississippian societies of the Alabama Coastal Plain. This paper integrates these documentary data with the archaeological record in a synopsis of Alabama Coastal Plain late Mississippian political alignments.

Custer, Jay (Delaware) and Michael Stewart (Louis Berger and Associates, Inc.)

[64] PALEOINDIAN ADAPTATIONS AND LITHIC RESOURCE USE IN NORTHEASTERN NORTH AMERICA

Continued research on Paleoindian cultures of Northeastern North America has generated a series of data which highlight the variability of Paleoindian adaptations. Lithic resource utilization patterns provide insights into this variability. Some raw material utilization patterns are similar throughout the region, i.e., a focus on high quality cryptocrystallines. However, variation in other aspects of raw material use coupled with variation in site structure, tool kits, the locations of stray point finds, and local paleoecology suggest considerable variation in adaptations. A major difference is noted between the central Middle Atlantic and the New York-Eastern Canada-New England areas.

Custer, Jay (Delaware) [Discussant 19]

Dahlin, Bruce H. (Howard) and Kevin O. Pope (TGS Technology Inc., NASA Ames Research Center)

[79] THE HYDROLOGICAL REGIME IN THE SEASONAL SWAMP AT EL MIRADOR AND ITS IMPLICATIONS FOR INTENSIVE AGRICULTURE

Ground survey, excavation, and analysis of radar imaging from airborne, Seasat, and shuttle flights was performed to understand the hydro-dynamics of a seasonally inundated swamp or bajo adjacent to the large Maya site of El Mirador, Peten, Guatemala. Because large Maya sites are often situated near bajos, it has long been assumed that they were intensively farmed using raised field techniques. Our data show that the hydrological regime was not amenable to raised field cultivation without exorbitant labor expenditures and that it was not practiced here.

Dalan, Rinita (Southern Illinois-Edwardsville), William Iseminger (Cahokia Mounds State Park),

George R. Holley (Southern Illinois-Edwardsville) and Melvin L. Fowler (Wisconsin-Milwaukee)

[60] A RECONSIDERATION OF THE CENTRAL PALISADE AT THE CAHOKIA SITE

The Central Palisade at the Cahokia site has been the subject of archaeological investigations for more than 20 years. Recent research, combining remote sensing and excavation, has contributed insights into the relationship of this palisade to the social and physical structure of the site. Implications of the timing of palisade construction with the gradual decline of the Cahokia polity and the placement of this feature in reference to natural and artificial topography are explored.

Dales, George F. (UC-Berkeley)

[10] THE HARAPPA PROJECT AND THE QUESTION OF EARLY STATES

The concepts of "urbanism," "civilization," and "statehood" are the subjects of conflicting hypotheses in the literature, especially concerning the ancient Indus Valley. Some scholars suggest that the Indus culture never was "urbanized"; others deny it the status of a major "civilization"; and recently the concept of an Indus "State" is being challenged. The Harappa Project is focusing on these questions through the investigations of a multi-disciplinary staff using modern data recovery and analytical methodologies. These issues are addressed in the light of the new research at Harappa.

Dancy, William S. (Ohio State)

[5] VILLAGE ORIGINS IN CENTRAL OHIO: THE RESULTS AND IMPLICATIONS OF RECENT MIDDLE AND LATE WOODLAND RESEARCH

Recent investigations of Middle and Late Woodland settlements in central Ohio have produced concrete data on questions of settlement pattern and human ecology. Excavations and survey data from sites on the Middle and Upper Scioto and Upper Licking rivers are summarized along with a consideration of the bearing they have on the cultural changes of the 5th and 6th centuries A.D. From this work it appears that Middle Woodland communities lived in dispersed hamlets while Late Woodland communities aggregated in nucleated villages. Potential causes of this change (e.g., popula-

tion growth, climatic change, technological innovation, and inter-regional social relations) are examined.

Davidson, Thomas E. (Jamestown Foundation)

[59] THE HALAF-UBAID TRANSITION IN THE WADI DARA AREA

Excavation and survey data from chalcolithic sites along the upper Khabur River and its tributaries indicate that the Halaf-Ubaid transition was more than just a change in the dominant style of painted pottery that was being made and used in the region. The transition also is marked by changes in other categories of material culture and by an apparent shift in settlement pattern as well. The Halaf-Ubaid transition, as it is manifested at sites in the Wadi Dara area of the Khabur headwaters region, is examined and an attempt is made to define what the term "transition" actually means in this localized context.

Davis, Hester A. (Arkansas Archeological Survey)

[58] WOMEN IN TEOCENTLI INROADS IN THE OLD BOYS NETWORK

Teocentli is an informal communication mechanism amongst about 100 anthropologists, which is in its 62nd year. It was founded by Carl Guthe in 1926 as a way for friends doing research on "the corn cultures of the New World" to communicate. It combined, and still combines, information on research with personal notes. No women were included in the first two issues. By 1941, there were only four; in 1988, there were ten women out of the 64 respondents, plus four more whose communication was written jointly with their husbands who are also anthropologists. Perhaps *Teocentli* is a microcosm of the history of archaeology, of the life of archaeologists, and of the increasingly important role played by women in this profession. It certainly contains their own thoughts on their own contributions.

Day, Jane Stevenson (Denver Museum of Natural History)

[75] SHARED SYMBOLS: GREATER NICOYA AND CENTRAL MEXICO

Lower Central America has long been a meeting place of cultural traditions from various areas of the New World. Situated at the crossroads of northern South America and Mesoamerica, people, ideas and influences came and went leaving their imprint on indigenous cultures. Beginning at about A.D. 800, imagery reflecting the symbol system of Central Mexico can be recognized as decorative elements on ritual items from burials in the Great Nicoya area of Costa Rica/Nicaragua. This paper examines the evidence and proposes an explanation for observed resemblances in iconography in these two distinct geographic regions.

De Atley, S. P. (see Bishop, R. L.) [12]

De Mott, Carol A., Rodney C. De Mott and Neal H. Lopinot (Southern Illinois-Edwardsville)

[76] ARCHAEOBOTANICAL ANALYSIS OF A BURNED MISSISSIPPIAN STRUCTURE AT CAHOKIA

Archaeological investigations at the Cahokia site in 1985 resulted in the identification of a burned Late Stirling phase wall trench structure with an in situ material inventory. The systematically collected archaeobotanical remains from within the structure and their spatial relationships with interstructural features and artifacts are discussed. Only two catastrophically burned structures have been identified at Cahokia to date, and the comparatively large amounts of recovered archaeobotanical remains provide important data on household economic and social activities.

De Mott, R. C. (see De Mott, C. A.) [76]

de Quiros, F. B. (see Cabrera Valdes, V.) [2]

Deagan, Kathleen A. (Florida Museum of Natural History)

[22] ACCOMODATION AND CONFLICT: PROCESS AND IMPACT OF SPANISH COLONIZATION IN SIXTEENTH CENTURY FLORIDA

The first successful permanent European colonization effort in America north of Mexico took place at St. Augustine, Florida. St. Augustine was founded in 1565 and remained a small, fragile and isolated frontier outpost until Florida was ceded to England in the eighteenth century. Nevertheless, the settlement had an important impact not only on the native societies of sixteenth century Florida, but also on the ways in which Europeans in North America learned to adapt to New World conditions and crystallize a genuinely European-American cultural tradition. A summary is given of the archaeological evidence bearing upon Spanish adaptive strategies, Amerindian-European interaction, and how these processes articulated to foster a hybrid Hispanic-American tradition.

Deal, Michael (Memorial-Newfoundland) [Discussant 31]

Dearborn, David S. P. (Lawrence Livermore National Laboratory)

[78] OBSERVATORIES AND CEREMONY IN TAWANTINSUYU

The Inca made precise observations to monitor the motion of the sun as well as ceremonial observations as part of the worship of Inti. In this paper we present evidence to support a proposal that the pillars on the hills around Cuzco were part of a system of ceremonial observatories designed to permit simultaneous participation by large groups.

Debenath, Andre (Institut du Quaternaire)

[2] THE PLACE OF THE MOUSTERIAN FROM CHARENTE IN THE MIDDLE PALEOLITHIC OF SOUTHWEST FRANCE

This paper attempts to delineate the different Mousterian groups which are now known in the Charente Basin and to show their relationship with the Mousterian lithic assemblages of Southwest France, e.g., Chalose, Perigord, etc. Some types of behavior of the neanderthals are studied through the lithic assemblages and some of the structures are found in rockshelters and caves. The author also gives his feelings for the spiritual life of the neanderthals in this area.

DeBloois, Evan I. (USDA Forest Service-Washington)

[63] CULTURAL RESOURCE MANAGEMENT IN THE USDA FOREST SERVICE: THE SECOND TWENTY YEARS

The USDA Forest Service began its program of cultural resource management with the hiring of its first archaeologist beginning in the summer of 1970. Since that beginning, the Forest Service has expanded its CRM program to nearly 200 archaeologists, anthropologists, and historians working on 150 National Forests and 40 National Grasslands from Florida to Alaska and from California to Maine. Budgets have expanded from a few thousand dollars in 1970 to over \$15.5 million for fiscal 1989. In the last several years noticeable new forces and concerns began to shape and redirect the efforts of the Forest Service's CRM program. A gradual shifting from concerns of compliance with preservation regulations to one of protection and preservation of cultural resources for the public benefit is seen. The future direction of the program is beginning to appear. This paper will deal primarily with current forces and future directions of the Forest Service's CRM program.

DeBoer, Warren (Queens-CUNY) [Discussant 31]

DeFrance, Anne Swearingen and Jane Stone (Montana State)

[48] MUSEUM DATABASE: A RELATIONAL DATABASE PROTOTYPE FOR COLLECTIONS MANAGEMENT AND RESEARCH

Museum Database was designed for a medium sized archaeological museum. The goals accomplished were 1) to provide for both administrative and research needs, including management of visual data (e.g., photographs, drawings), 2) create an exceptionally user-friendly interface, 3) utilize a relational database design, and 4) to keep costs to a minimum. The relational design allows all data items to be retrieved, in any combination, and for data to be added, updated, or deleted without creating anomalies. The database design can be customized for any museum or project, and for use with any relational database software package.

Demarest, Arthur and Stephen Houston (Vanderbilt)

[11] THE DYNAMISM AND HETEROGENEITY OF ANCIENT MAYA STATES

Recent archaeological and epigraphic research has revealed the great complexity of the Maya political landscape over time and space. During the period from 300 B.C. to A.D. 1000, each site had a different developmental trajectory and a distinct period of florescence. Over space, any given period had polities ranging from petty chiefdoms to large, if only briefly successful, conquest states. Evidence for such Maya political dynamics is presented and ethnographic models are evaluated against new historical and archaeological data from the Petexbatun region and other areas of the southern Maya lowlands.

Demarest, A. (see Pye, M. E.) [35]

Demarest, A. (see Arroyo, B.) [35]

DePratter, C. (see Hudson, C.) [1]

Desjean, T. (see Wilson, R. C.) [33]

Dewez, Michel (Catholique de Louvain)

[51] PRODUCTION STRATEGIES OF BONE AND ANTLER TECHNOLOGY IN BELGIUM

Aurignacian and Magdalenian antler working is compared. These technological strategies are discussed in relation to the nature of the raw material and to the production of desired tool forms. Based on material recovered during excavations at Grotte Walou, Belgium, it is clear that both reindeer antler

and red deer antler were available during the Aurignacian. Red deer antler was preferred for tool manufacture even though it is denser, more compact, and more difficult to work than reindeer antler. Given the same choice, reindeer antler was the material of choice during the Magdalenian. Refitting of percussion shatter indicates that percussion techniques were used to work red deer antler during the Aurignacian. During the Magdalenian, the groove and splinter technique was used.

Dibble, H. L. (see Rolland, N.) [24]

Dietler, Michael (UC-Berkeley)

[80] BARBARIAN BORROWING: DEMAND FOR THE EXOTIC AND THE POLITICAL ECONOMY OF EARLY IRON AGE SOUTHERN FRANCE

The adoption of elements of Greek and Etruscan culture by Early Iron Age indigenous peoples of southern France, a process commonly (and incorrectly) described as "Hellenization," was neither passive nor random, but a creative transformation of two specific aspects: objects related to drinking wine and techniques used in pottery manufacture. The explanation of this selective demand for exotic cultural elements, and of the social effects stemming from their adoption, lies in the native political economy. The social meaning and role of the two ceramic wares ("Pseudo-Ionian" and "ceramique grise") which were developed after contact (by combining imported techniques and a mixture of exotic and native forms) are assessed through examination of their relation to demand for imported wine and of their place in indigenous patterns of consumption in general.

Dillehay, Tom D. (Kentucky)

[8] USE AND DISCARD OF UTILITARIAN AND NON-UTILITARIAN GOODS IN LARGE SCALE PUBLIC CEREMONY: AN ETHNOARCHAEOLOGICAL PERSPECTIVE FROM THE MAPUCHE OF CHILE

In the study of complex societies archaeologists often rely on the content and distribution of materials in ceremonial sites to reflect on the social and economic organization of a society. To date, little ethnoarchaeological information exists on the content, use, and discard of utilitarian and non-utilitarian goods before, during, and after public ceremony, and on informant accounts and site layout and composition. The results of twelve years of intermittent research and monitoring of several large, architectural and non-architectural ceremonial fields in the Mapuche society are analyzed. These results are discussed in terms of their archaeological implications.

Dincauze, Dena (Massachusetts) [Discussant 58]

Dizon, Eusebio Z. (Pennsylvania)

[3] IS THERE AN IRON AGE IN THE PHILIPPINES?

It has been argued that a "Philippine Iron Age" began around 500-200 B.C. The results of my archaeometallurgical study on whether the term "Iron Age" is viable in the Philippine context are summarized. The appearance of iron in certain areas of the Old World is surveyed. Iron artifacts from the Philippines were tested metallographically. Philippine ethnographic and ethnohistorical records were examined for the supply of iron by Chinese traders and local blacksmithing. I conclude that there were iron-using societies in some areas of the Philippines beginning about 370 B.C., but no real Iron Age is evident.

Dobyns, Susan (Arizona)

[74] PERSPECTIVES FROM THE RECENT PAST: INDIGENOUS SOCIAL STRATIFICATION SYSTEMS IN CULTURE CONTACT AND CHANGE

Nowhere is the interface between social complexity and exchange any more vital than in early intercultural interactions between Islanders and Euroamericans. While many recent Oceanic case studies have described dynamic and purposeful interactions, there have been few comparative analyses of the commonalities and differences in Islander-Euroamerican contact, exchange, and interaction. Drawing from both archaeological and ethnographical data, the importance of indigenous stratification systems is examined in the structuring of, and the response to, contact period exchanges between Islanders and Euroamericans.

Doershuk, John and John P. Hart (Northwestern)

[71] LANDSCAPE UTILIZATION: AN EVOLUTIONARY PERSPECTIVE

The use of the term sedentism in cultural evolutionary studies of prehistoric hunter-gatherers has become increasingly common during the past decade. Concern with the origin of sedentism has often become a goal in itself serving to shift research away from the explanation of spatial and temporal variation in landscape utilization. We review the development of the sedentism concept and propose an alternative approach that stresses the dynamics of regional positioning strategies. Changes in these

strategies are viewed as responses to exogenous and endogenous pressures operating on hunter-gatherer societies.

Donahue, D. J. (see Long, A.) [39]

Donahue, Jack (Pittsburgh) and David R. Watters (Carnegie Museum of Natural History)

[50] BARBUDA, LESSER ANTILLES: SHORELINE CHANGE BEFORE AND DURING PREHISTORIC AND HISTORIC OCCUPATION

The island of Barbuda, Lesser Antilles, demonstrates progradation or expansion through time. The eastern three-fourths of the island originated in Mio-Pliocene time and expanded from the east through the Pleistocene. Integration of geologic and prehistoric occupation data strongly suggest that the western one-fourth of the island, the Lagoon and Palmetto Point, originated after occupation. A sequence of historic maps demonstrates unequivocally that Palmetto Point is continuing to expand in a southward direction.

Donahue, Randolph E. (SUNY-Stony Brook)

[66] SETTLEMENT, SEASONALITY, AND SITE FUNCTION IN THE ITALIAN FINAL EPIGRAVETTIAN

As in other regions and in other periods of the Paleolithic, controversy emerges over attempts to explain the variability among Italian Final Epigravettian (14,000-8,000 B.P.) assemblages. Analysis of lithic artifacts from Paglicci cave indicates that a strong association exists between certain artifact types and specific tool functions and activities. Given this, and our understanding of activities, seasonality, and site function, a comparative study of Final Epigravettian site assemblages provides strong support for Barker's model of hunter-gatherer seasonal transhumance with upland summer sites and lowland winter sites. It also demonstrates strongly that there exists within each of these topographic zones a simple dichotomy of base camps and hunting camps.

Donahue, R. E. (see Colten, R.) [34]

Douglas, John E. (Arizona)

[61] A REEVALUATION OF NONLOCAL CERAMICS AT PAQUIME (CASAS GRANDES) IN CHIHUAHUA, MEXICO, AND THE IMPLICATIONS FOR REGIONAL INTERACTION

The relatively high percentage of nonlocal ceramics at Paquime (Casas Grandes) has been considered an indication that the prehistoric settlement served as a hub of interaction within the southern Greater Southwest, particularly within the Northern Sierra region. After examining the assumptions underlying this formulation, the distribution of nonlocal ceramics at Paquime are analyzed through time and space (i.e., differences between room groups). Not until the last prehistoric phase in the sequence is there evidence of a sizeable increase in nonlocal ceramics and a nonrandom distribution of these ceramics between room groups. Alternative hypotheses for explaining the observed pattern are presented.

Douglas, John G. (BLM-Washington, D.C.)

[63] WHY NOT MANAGE CULTURAL RESOURCES?

We've talked about cultural resource management for 15 years now, but we haven't seen much management going on. Surely management has to be something more than rote determinations of National Register eligibility, rote section 106 compliance, and rote mitigation of effects. Maybe if we broaden our model of management, choke back our fears of the unknown, and apply what we do know, we can guide managers to insightful, long-range resource management decisions that develop and exploit cultural resources' special capacities as time resources. A model is offered that explores payoffs and invites participation in making management happen.

Downum, C. E. (see Sullivan, A.) [12]

Doyel, David E. (Pueblo Grande Museum)

[61] PREHISTORIC INTER-REGIONAL CERAMIC EXCHANGE IN SOUTHERN ARIZONA

Between A.D. 750-1050, interregional ceramic exchange among the prehistoric Hohokam of southern Arizona cross-cut major drainage systems. Between 1050 and 1250, non-local ceramic exchange between the Salt and the Gila River valleys appears to diverge, while convergence in non-local ceramic assemblages is apparent for the 1250 to 1450 period. The results of analysis of non-Hohokam ceramics recovered from Snaketown, Pueblo Grande, Las Colinas and other Hohokam villages are used to evaluate the recent hypothesis that the major rivers in southern Arizona served as barriers to interregional non-Hohokam ceramic exchange.

Driver, Jonathon C. (Simon Fraser)

[15] SCALES OF ANALYSIS IN ZOOARCHAEOLOGY

Most zooarchaeological analysis is conducted at the site level and most interpretation is undertaken in a cultural-ecological framework. In this paper it is argued that one of the problems which has inhibited the growth of zooarchaeology is the mis-match of scale of analysis and interpretative framework. Using examples from Britain and North America it is demonstrated that while inter-site or inter-regional variation is best understood in terms of cultural ecological models, inter-feature or intra-site variation must be examined in terms of refuse disposal patterns, and inter-context or intra-feature variation requires an understanding of the changing functions of features over short time spans.

Dunbar, James (Crawfordville, FL)

[50] THE NATURAL RESOURCE ORIENTATION OF CLOVIS AND SUWANNEE AGE PALEOINDIAN SITES IN FLORIDA WITH PARTICULAR REFERENCE TO THE OUTER CONTINENTAL SHELF

Ninety percent of the known Paleoindian sites in Florida containing Clovis, Suwannee or Simpson points and associated artifacts are located near karst depressions that penetrate the limestone aquifer. This distribution of Clovis/Suwannee sites indicates settlement patterns were centered where natural resources were most abundant, particularly potable water and lithic supplies. Given the difficulties associated with locating offshore sites, the model based on the type and distribution of sites on the adjacent coast will be reviewed and potential for locating Paleoindian site clusters in the Eastern Gulf of Mexico will be discussed.

Dunham, P. S. (see Leventhal, R. M.) [11]

Dunnell, Robert C. (Washington)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Dunnell, R. C. (see Madsen, M.) [52]

Dunnell, R. C. (see Simek, J. F.) [17]

Dunning, Nicholas (Minnesota)

[11] THE GEOGRAPHY OF POWER IN THE TERMINAL CLASSIC, NORTHERN PUUC, MEXICO

Analysis of new survey data from the northern Puuc suggest a seven-tiered settlement hierarchy, with major sites spaced at eight to twelve kilometer intervals, smaller sites cluster near surrounding zones of productive soils and near the conjectural boundaries of major site polities. The regional settlement hierarchy changed through time, culminating in the development of Uxmal as a regional capital. Elite group control in the Puuc appears to have been based on a perceived ability to ritually ensure rainfall and agricultural productivity. Precariously high Terminal Classic populations made the region vulnerable to agricultural failure and threatened the stability of the socio-political system.

Duszynski, D. J. (see Essenpreis, P.) [78]

Dye, David (Memphis State)

[1] WARFARE IN THE SIXTEENTH CENTURY SOUTHEAST: THE DE SOTO EXPEDITION IN THE INTERIOR

Native American contact with Europeans began in the interior Southeast, particularly the Mississippi Valley, when members of the De Soto expedition pushed inland from their winter encampment near Tallahassee in March of 1540. The entrada fought their way through the interior until July of 1543. I discuss the native reaction to Spanish presence in terms of Mississippian patterns of defensive and offensive tactics. Ethnohistorical accounts of chiefdom warfare may provide insights concerning the nature of chiefly political strategies and posturing in relation to external threats and consequent decisions ruling elites may make either in terms of political alignment or the deployment of armed forces.

Earle, Timothy K. (UCLA) [Discussant 4]

Earle, Timothy K. (UCLA) [Discussant 74]

Early, Ann (Arkansas Archeological Survey) [Discussant 27]

Eddy, F. W. (see Malville, J. M.) [78]

Edens, Christopher (Peabody Museum-Harvard)

[72] WATER, TRADE AND URBANISM ON THE LITTORAL OF THE ARABIAN GULF

Urban settlement in the Arabian Gulf responds to two principal intersecting factors—water and trade. Free access to water allows development of agriculture and relatively dense populations. Interregional trade flows through these population centers, thereby enhancing generation of wealth, political power and urban forms of life. Waterless areas lack an indigenous agricultural base, and in the absence of a local product of value also the means to enter interregional trade. These constraints were overcome in the later first millennium B.C. At that time pearling greatly intensified in response to growing interregional demand, permitting emergent urban polities based on imported foodstuffs. These themes are developed using Qatar as an example.

Edging, Richard and Paul Kreisa (Illinois)

[52] PERSPECTIVES ON LATE PREHISTORIC SUBSISTENCE ECONOMIES IN THE MID-SOUTH

Recent fieldwork in western Kentucky has yielded substantial new data on Mississippian botanical and faunal exploitation strategies. The botanical materials and their interpretation are especially important since the analysis of such remains is conspicuously absent from many major Mississippian towns excavated in the past. New botanical and faunal data from four Mississippian towns in western Kentucky are compared with substantial data from smaller sites which has been collected in adjacent regions of the Mid-South. Apparent cultural differences, often based on artifact assemblages and settlement patterns, are reviewed in light of subsistence economies practiced in the Late Prehistoric Mid-South.

Ehrenreich, Robert M. and Massimo Vidale (Smithsonian)

[34] METALLURGICAL WORKSHOPS: PRODUCTION IN THE FOOTHILL SETTLEMENTS OF NORTHEASTERN ITALY

A long chain of small, foothill settlements has been discovered bordering two geographically and culturally distinct zones in northeastern Italy. Two findings are significant: 1) the metallurgically-based communities of the mountains thrived on the trade of the metals produced from the rich, indigenous ore sources; 2) the agriculturally-based settlements in the Po Valley were the first Early Iron Age centers to form large proto-urban settlements. The foothill settlements survived by refining and finishing the resources obtained from each area before trading these products to the larger neighboring regions. The ethnic and economic basis of survival for these culturally distinct boundary sites will be discussed using data from the metallurgical workshop at Santorso.

Ellis, Chris J. (Northeastern Archaeological Associates), Lawrence J. Jackson (Southern Methodist) and Heather McKillop (Trent)

[64] APPROACHES TO PALEOINDIAN ECONOMY: NEW THEORETICAL DIRECTIONS FOR THE SOUTHERN GREAT LAKES REGION

The history of investigations of early Paleoindian in the Great Lakes region is reviewed from 1933 to 1988 and underlying theoretical assumptions are examined. Although the past three decades have seen much active field work, Paleoindian studies generally lack the sophistication needed to approach complex problems of settlement and subsistence, let alone economic reconstruction. We suggest a number of new directions for improving our understanding of this important period of New World prehistory.

Ellison, James G. (Florida)

[81] HUNTER-GATHERER SETTLEMENT PATTERNS OF THE TERMINAL PLEISTOCENE/EARLY HOLOCENE IN THE HORN OF AFRICA

Anthropology of the last decade has devoted much attention to models emphasizing the relationship between the predictability and density of resources and human settlement patterning. An ongoing multidisciplinary study of the Late Stone Age in southern Somalia offers an opportunity to test such an approach using a combination of local archaeological and geomorphological data and paleoclimatological information about the Horn. These data contribute to a model of hunter-gatherer settlement change from the cool and arid terminal Pleistocene through the warm and humid early Holocene. This report discusses the results of a one hundred percent survey testing the model.

Elmendorf, Julia (Jill) (Tennessee Valley Authority)

[33] A ROLE FOR THE AMATEUR ARCHAEOLOGIST: ALLIES IN DECREASING SITE LOOTING

Amateurs in the southeast have long played an important role in archaeological research. Although the current relationship between amateurs and professional archaeologists is not very good in many

cases, amateurs should be seen as allies in our efforts to control site looting. Various groups have had success in using amateurs to prevent site destruction. A clear role for amateurs should be developed by the profession that assures them the recognition and respect they want. Various means of positive reinforcement of amateur efforts are discussed.

Elston, Robert G. (Intermountain Research)

[41] QUARRY PITS AND BIFACE CACHES: IMPLICATIONS FOR MODELS OF LITHIC PROCUREMENT AND TRANSPORTATION

The weight and density of toolstone limits the amount of lithic material that an individual can transport. Recent research at Tosawih (White Knife) Quarries (26EK3032) in north central Nevada suggest that one solution to this problem is a mixed strategy involving both "direct" and "embedded" lithic procurement. Episodes of intensive quarrying are relatively infrequent, although perhaps of several days duration. During these episodes, large amounts of processed toolstone are produced in the form of flake blanks and bifaces. What cannot be immediately transported is cached at the quarry to be retrieved as needed, without the necessity of further excavation.

Emerson, Alice (Washington State)

[43] VARIABILITY IN BISON CARCASS COMPOSITION AND THE CONSTRUCTION OF CARCASS UTILITY MODELS FOR USE IN ARCHAEOLOGICAL APPLICATIONS

Variability in bison muscle, marrow, bone grease, and body fat production and distribution is examined and an evaluation is made of how these differences influenced prehistoric hunters' prey selection, butchering and processing decisions. An attempt also is made to evaluate how current models of carcass utility can be adjusted to accommodate the variability observed in carcass composition to provide greater flexibility and explanatory power in their archaeological applications. Data for these evaluations come from analyses of four bison carcasses provided for study by Theodore Roosevelt National Park in a National Science Foundation sponsored study.

Enloe, James G. (New Mexico)

[51] FAUNAL EVIDENCE FOR SUBSISTENCE CHANGE IN THE UPPER PALEOLITHIC

Data from Couche V, an Upper Perigordian level, at Le Flageolet (ca. 25,700 B.P.) and from Niveau IV-2, a Magdalenian level, at Pincevent (ca. 12,000 B.P.) suggest a contrast in butchering and consumption patterns of faunal resources. Although each faunal assemblage consists of more than 95 percent reindeer, evidence from body part representation, cut marks, and bone breakage suggest immediate consumption of kills in the earlier case and preparation for storage in the later case. This contrast would be consistent with a shift from a foraging type of organization to one of logistical collecting. Site structural data are used to evaluate this proposition.

Erickson, Clark L. (Pennsylvania)

[16] METHODOLOGICAL CONSIDERATIONS IN THE STUDY OF ANCIENT ANDEAN FIELD SYSTEMS

Prehistoric raised field agriculture provided the economic base for complex society in the Lake Titicaca Basin of Peru and Bolivia. The study of this agricultural technique provides detailed information about technological sophistication, social organization, and cultural values of raised field farmers. A combination of trenching, topographic mapping, soil and flotation analysis, aerial photographic interpretation and experimental archaeology provide an effective methodology for approaching these issues. These methodologies can be applied to the study of other ancient garden and field systems throughout the world.

Eriksen, Berit Valentin (Aarhus)

[34] MODELING INTERSITE SETTLEMENT PATTERNS IN THE LATE PALEOLITHIC AND EARLY MESOLITHIC OF SOUTHWEST GERMANY

Settlement analyses form the basis for an examination of how resource exploitation and internal socio-dynamics influenced one another during the Late Glacial and Early Postglacial of the Swabian Alb. Multiple Correspondence Analyses are employed to investigate different forms of resource exploitation regarding covariation of environmental conditions, subsistence economy and demography. Cartographical analyses form the basis for a discussion on territoriality, mobility and communication. Based on these analyses, an explanatory model integrating different sites in a regional, intersite system of behavior is proposed. Suggestions for future lines of research for testing the model are given.

Erlandson, Jon M. (UC-Santa Barbara)

[7] ON RECONSTRUCTING DIETS FROM CALIFORNIA SHELL MIDDENS

For decades, archaeologists have tried to reconstruct the diet of coastal hunter-gatherers by analyzing faunal remains from shell middens. The problems involved in the sampling of California middens are

reviewed and methods used by California archaeologists to reconstruct prehistoric diets are critically examined. Particular emphasis is placed on problems that have plagued midden analyses for decades, including: 1) the differential effects of screen size on the recovery of various classes of faunal remains; 2) distinguishing faunal remains of natural versus cultural origin; 3) conversion from archaeological to nutritional units of analysis; and 4) assessing the nutritional role of animal foods given the selective disintegration of most plant food remains.

Essenpreis, Patricia (Florida) and David J. Duszynski (Cincinnati Museum of Natural History)

[78] ASTRONOMICAL ALIGNMENTS AT THE HOPEWELLIAN FORT ANCIENT SITE

Recent research at the Hopewell site of Fort Ancient suggests that a portion of the earthwork may have been laid out as a solar and lunar observatory. In general the site is very irregular in form, with the walls tending to follow the bluff edge. However, the northeastern portion of the work is laid out with geometric precision and contains four mounds that form a perfect square 155 meters on a side. Recent survey indicates that an observer standing on the western mound of this square could sight through particular gateways and align with the northernmost moonrise, the summer solstice sunrise, and the minimum northern moonrise.

Etchieson, Meeks (USFS-Ouachita)

[27] PREHISTORIC USE OF GEOLOGICAL RESOURCES IN THE OUACHITA MOUNTAINS

The Ouachita Mountains cover a large area in west-central Arkansas and southeastern Oklahoma. The geologic resources found within the mountains are varied and widespread. These resources include, but are not limited to, novaculite and quartz crystals. These materials, among others, were widely used and traded in prehistoric times.

Evans, Susan (Pennsylvania State) and AnnCorinne Freter (Ohio)

[25] HYDRATION ANALYSIS OF OBSIDIAN FROM CIHUATECPAN, AN AZTEC PERIOD VILLAGE IN MEXICO

The results of a chronometric analysis of obsidian excavated from Cihuatecpán, an Aztec period village in the Teotihuacan Valley, Mexico is presented. In spite of the wealth of archaeological and ethnohistoric materials pertaining to the Aztec period, many questions remain about the timing of demographic trends and broad historical events. Obsidian hydration analysis has yielded a set of dates ranging from A.D. 1040 to 1611, substantiating the general range of village chronology as determined by ceramics and documents, and indicating that villages like Cihuatecpán were probably established by Toltec migrants and enjoyed rapid growth in subsequent generations.

Evet, Daniel (Ithaca, NY)

[34] MODELING MESOLITHIC PLANT FOOD CONSUMPTION: THE CASE FROM ITALY

The current view of the European Mesolithic holds that this cultural episode largely presaged the succeeding Neolithic. It is generally agreed that deviations from the antecedent Upper Paleolithic subsistence patterns were central to this transformation, but the relative importance of plants and animal foods is less settled. A "Mesolithic Plant Food Consumption Model," originally stimulated by archaeological and paleoenvironmental data from Italy, suggests that the underlying factor in both the nature and pace of early Holocene cultural changes, whether "Mesolithic" or "Neolithic," was a substantial increase in plant food consumption.

Ewen, Charles (Florida Bureau of Archaeological Research)

[22] THE RISE AND FALL OF PUERTO REAL

Puerto Real, founded in 1504, was one of the earliest settlements on Hispaniola. Intended to be a major city, it suffered its first economic setback when nearby mineral deposits proved disappointing. Although buoyed by a brisk trade in slaves and hides, the economy of Puerto Real was dealt a crippling blow when its port was not included on the route of the Spanish fleets. A heavy reliance on locally manufactured items and smuggling bear mute testimony to life in an economic backwater.

Ewen, Charles (Florida Bureau of Archaeological Research)

[1] SOLDIER OF FORTUNE: HERNANDO DE SOTO IN THE TERRITORY OF THE APALACHEE, 1539-1540

Hernando de Soto was a seasoned campaigner who had been involved in the successful conquest of the Inca empire. His ambition led him to attempt the conquest and colonization of La Florida. The route of his ill-fated expedition has proven elusive to researchers. The discovery of de Soto's 1539-40 winter camp site in Tallahassee provides a solid spatial marker on the route. The artifacts recovered from the site indicate the reliance of the Spanish on locally produced goods, the type of trade goods brought by the Spaniards, and refines the ceramic chronology for the Apalachee territory.

Fagan, Brian M. (UC-Santa Barbara)

[23] **ARCHAEOLOGY, LOOTING, AND THE PUBLIC**

Public perceptions of archaeology often revolve around romantic images of the past, of buried treasure and mysterious civilizations. There is also a widespread view that archaeology is a luxury. By the same token, archaeologists regard the public, in many instances, as an irrelevance. This presentation discusses some of the strategies for improving communication between professional archaeologists and the public. It also enumerates the basic responsibilities of archaeologists toward the wider audience.

Falconer, Steven E. (New York), Mary C. Metzger (Mercerville, NJ) and Patricia L. Fall (New York)

[46] **EARLY VILLAGE LIFE IN THE JORDAN VALLEY: A STUDY OF RURAL SOCIAL AND ECONOMIC COMPLEXITY**

Rural growth, rather than urban preeminence, marked the development of complex society in the Southern Levant during the second millennium B.C. Excavations at the farming hamlet of Tell el-Hayyat in the Jordan Valley reveal an unexpected diversity of social and economic activities that characterized Bronze Age villages, and linked them to larger towns. Spatial analysis of faunal and floral deposition distinguishes household subsistence behavior from communal religious activities at village temples. Inference of animal slaughter schedules and butchering practices, and neutron activation analysis of pottery production, suggest a variety of roles played by even the smallest communities in regional economic systems.

Fall, P. L. (see Falconer, S. E.) [46]

Farizy, Catherine (Laboratoire d'Ethnologie Préhistorique)

[24] **SUBSISTENCE AND SOCIAL ORGANIZATION OF MIDDLE PALEOLITHIC LOCAL GROUPS**

Is it possible to study Middle Paleolithic cultural behavior at a level of integration higher than the settlement? It is possible to demonstrate, through one settlement, that local groups (i.e., several related families) shared a given range of activities part of the year (for instance consumption activities) in a specific area-settlement. These questions will be debated through the examples of different categories of vestiges provided by open air sites. What is the possible relation between meat consumption, raw material consumption and local group behavior? In the Middle Paleolithic settlements examined (especially Champlost and Mauran) the presence (or absence), location and associations of the different remains (faunal remains, flint, burnt remains) are reviewed.

Fash, Jr., William (Northern Illinois)

[11] **POLITICS, PATRONAGE AND POLITY IN THE EVOLUTION OF DYNASTIC POWER AT COPAN, HONDURAS**

Archaeological, epigraphic, and iconographic evidence from the Classic Period remains in Copan, Honduras are synthesized to illuminate the evolution of dynastic power at the southeastern-most Maya city-state. Present indications are that dynastic authority reached its greatest degree of centralization and territorial extent at the mid-point of Copan's Classic Period trajectory, in the seventh century A.D. Evidence for royal patronage and other political strategies of the state designed to adapt to the proliferation of cadet lineages and nascent chiefdoms in the surrounding region are documented and analyzed to place the political collapse of the Copan polity in evolutionary perspective.

Fedele, Francesco (Naples)

[72] **MAN-ANIMAL RELATIONS IN PREHISTORIC YEMEN**

The ongoing work of the Italian Mission to North Yemen has revealed for the first time a highland Bronze Age (ca. 2,000 B.C.) configuration and has better illuminated earlier Holocene hunter-gatherer occupation in the highlands as well as the Tihama coast and the Yemeni fringes of the Rub al Khali. The faunal record from these three environmental zones allows a comparative study of adaptation to these very different environments during the Middle Holocene, and enables a view of diachronic changes, particularly in the uplands, related to the settling-in of food producing communities.

Feder, Kenneth (Central Connecticut State)

[68] **PREHISTORIC OCCUPATION OF UPLAND HABITAT IN SOUTHERN NEW ENGLAND**

Archaeological surveys in southern New England have focused on coastal and major riverine habitats. The presumption has been that these offered the most attractive suite of characteristics to prehistoric hunter-gatherers. Indeed, many sites have been found in such regions while uplands have been largely ignored or surveyed less intensively. The possibility of a seasonal emphasis on upland resources, or of a distinct settlement/subsistence system focused on the uplands remains largely unassessed. To address the question of upland use, uplands in northwestern Connecticut have been surveyed and nearly 100 sites located. Their role in prehistoric settlement patterns is here discussed.

Fedick, S. L. (see Ford, A.) [25]

Feinman, Gary (Wisconsin), Stephen Kowalewski (Georgia), Sherman Banker and Linda Nicholas (Wisconsin)

[29] **CERAMIC PRODUCTION AND DISTRIBUTION IN LATE POSTCLASSIC OAXACA: STYLISTIC AND PETROGRAPHIC PERSPECTIVES**

During the Late Postclassic period (900-1520 A.D.) the Valley of Oaxaca was subdivided into more than a dozen petty kingdoms. The production and distribution of locally-used pottery during this era of political decentralization is examined. Preliminary petrographic and stylistic analyses indicate that the scale of Late Postclassic pottery manufacture varied markedly over space, with larger-scale ceramic manufacture evident in the eastern (Tlacolula) arm. Based on this multi-dimensional ceramic study, it also is argued that utilitarian pottery production and distribution networks were at least partially independent of (and did not spatially correspond with) political boundaries during this late pre-Contact era.

Fialko, V. (see Laporte, J. P.) [11]

Fields, V. (see Reents-Budet, D.) [75]

Fisher, Jr., John (Smithsonian)

[8] **LINKS IN THE LIVES OF HUNTER-GATHERERS: ARCHAEOLOGICAL IMPLICATIONS AMONG EFE PYGMIES**

Ethnoarchaeological research among Efe Pygmies, present-day foragers in the Ituri Forest of Zaire, offers a case study to examine links between subsistence organization, aspects of social life, settlement patterns, and the organization of their technological repertoire. Efe have strong economic and socio-cultural ties with neighboring horticulturalists. These ties influence the Efe settlement pattern of constrained mobility. Ties with horticulturalists and constrained mobility affect, in turn, Efe technological organization, which contains a strong component of storage and abandonment of possessions at former habitation sites. The archaeological record resulting from this system will have distinctive characteristics.

Fisher, R. (see Fisher, W.) [16]

Fisher, William (Boston) and Richard Fisher (Utah State)

[16] **COWS, CHIPS, REEFS, AND PHYTOLITHS: THE ARCHAEOLOGY OF PASTURE AND RANGE**

Landscape archaeology may be defined as the study of the human modified landscape. Gardens and fields have recently become accepted areas of research for archaeological investigations. Few studies, however, have considered the pasture and range areas that are lightly impacted by man himself, but can be dramatically changed by his actions, especially by the introduction of domesticated animals. This paper introduces a method of environmental reconstruction using geological, historical, and archaeological principles to reconstruct previous vegetative assemblages and to determine the impact of domesticated animals on grassland areas.

Fitzhugh, William W. (Smithsonian) and Peter Clark (Oregon)

[50] **BEACH RIDGE CHRONOLOGY ON THE LABRADOR COAST: ARCHAEOLOGICAL, GEOLOGICAL, AND PALEOECOLOGICAL RESULTS**

Two decades of archaeological reconnaissance and excavation have provided a large series of radiocarbon determinations for use in reconstructing cultural, botanical, and geological history from the Strait of Belle Isle in southern Labrador to Killinek at the entrance to Hudson Strait, a distance of 800 miles. In addition to permitting the establishment of a detailed sequence of Indian and Eskimo cultures, the close association of archaeological settlements with active shorelines in these maritime based cultures allows detailed reconstruction of post-glacial geological history for the eastern edge of the Laurentide ice sheet, which has been impossible to study any other way due to the paucity of datable shells, peat, or whale bone. The methods, problems, and results of this dating program are discussed.

Flam, Louis (Colorado State)

[10] **THE SIND ARCHAEOLOGICAL PROJECT: THE KIRTHAR SURVEYS AND GHAZI SHAH EXCAVATIONS**

Excavations at the prehistoric site of Ghazi Shah as well as geomorphic and archaeological reconnaissance in the Lower Indus Valley (Sind Province), Pakistan, have provided a wealth of new data concerning the origin and character of the Indus Civilization. This illustrated presentation focuses on recent discoveries for paleogeographic reconstruction of prehistoric irrigation systems, settlement

patterns, craft production and specialization. These contribute to an explanation of cultural developments in Pakistan during the fourth and third millennia B.C.

Fleming, Stuart J. (MASCA-Pennsylvania) [Discussant 39]

Fleming, S. J. (see Swan, C. P.) [39]

Fletcher, Thomas (SUNY-Buffalo)

[34] SYSTEM SCALE, INFORMATION, AND ORGANIZATIONAL CHANGE IN TRIBAL SOCIAL SYSTEMS

Using data from Early and Middle Neolithic period sites in the Rhineland region of West Germany, this paper examines changes in the organizational structure of tribal social systems. Regional changes are identified through analysis of settlement and ceramic stylistic patterns relating to processes of tribal development. These patterns are compared with contemporaneous changes in community organization (status differentiation, leadership development, and social group integration) determined through analysis of settlement structure, architectural and mortuary variability. Using ceramic stylistic variability as a measure of information flow within a system, the role of information processing related stresses in organizational change is investigated.

Foradas, James G. (Ohio State)

[21] SOURCING OF FLINT USING NORMATIVE MINERAL COMPOSITIONS AND THE SCANNING ELECTRON MICROPROBE: AN EXPERIMENTAL STUDY USING FLINT RIDGE FLINT

A new, universally applicable flint sourcing method based on normative mineral compositions was tested on samples from two different prehistoric quarries at Flint Ridge, Ohio. Interformational distinctions were based on detrital mineral compositions, and intraformational distinctions were based on secondary mineral compositions of samples. The scanning electron microprobe was used to detect "marker mineral" abundances in replicas of "Hopewell" bladelets manufactured from flint samples collected from the two quarries. Tests of the effects of heat treatment on source identification were also conducted. The method was nondestructive making bladelets available for subsequent archaeological analyses.

Ford, Anabel (Social Process Research Institute) and Scott L. Fedick (Arizona State)

[25] PROGRAMME FOR BELIZE: MANAGEMENT OF PREHISTORIC MAYA CULTURAL RESOURCES IN A TROPICAL FOREST PRESERVE

The Programme for Belize is a consortium of Belizean and international organizations dedicated to the preservation of natural and cultural resources within Belize. The Coca-Cola Corporation has donated 40,000 acres of tropical forest lands to the Programme, and an additional 110,000 acres are being purchased. The Programme recognizes archaeological resource management as an important aspect of conservation planning and, as a first step, has sponsored an archaeological reconnaissance that was carried out in August of 1988. This project involved aerial and ground survey, and the mapping of a major center known as Las Milpas. The results of the reconnaissance, as well as background research, indicate an abundance of archaeological resources including prehistoric Maya centers, habitation sites, and agricultural features. These resources are described and plans for future management and research are presented.

Ford, S. (see Mees, G. C.) [16]

Fowler, Jr., Honorable Wyche (U.S. Senate)

[23] COMMENTS ON THE LOOTING OF ARCHAEOLOGICAL SITES

This presentation, by U.S. Senator Wyche Fowler from Georgia, will view the problem of the destruction of archaeological sites from the perspective of one of the country's leading legislators interested in historic and prehistoric site preservation. The Fowler bill, introduced by the Senator last fall, is one of the most comprehensive preservation bills ever presented to the Congress, and offers significant support for archaeology.

Fowler, M. L. (see Dalan, R.) [60]

Fowler, William R. (Vanderbilt)

[4] HOUSEHOLD DIFFERENTIATION AND THE PRODUCTION OF WEALTH: THE CASE OF 16TH-CENTURY IZALCO, EL SALVADOR

Extremely detailed documentary data allow unusually precise reconstruction of aspects of the political and domestic economy of several towns in the cacao-producing region of Izalco in the 1570's and 1580's. These data reflect a wide range of inequality in land ownership and differential productive

capacity of households. Since it served as a medium of exchange, cacao was a principal tribute commodity, but it also provided access to the marketplace. Low-volume producers and middlemen traders were thus articulated with the regional economy. Prehispanic antecedents of this pattern are suggested.

Fowler, W. R. (see Amaroli, P. E.) [62]

Fox, W. A. (see Williamson, R. F.) [19]

Fradkin, Arlene (Florida)

[43] CHEROKEE ANIMAL CLASSIFICATIONS: CORRELATES TO THE CHEROKEE ZOOARCHAEOLOGICAL RECORD

Folk semantic analyses may be correlated with the study of faunal remains recovered from protohistoric and historical archaeological sites. The language and culture of the Cherokee Indians living in the Overhill towns in eastern Tennessee during the eighteenth and early nineteenth centuries serve as the subject for the present study. Cherokee animal classifications are examined as a means of gaining insight into the significance of particular animals within the Cherokee culture. Such findings, in turn, are compared to the Cherokee zooarchaeological record. The latter consists of faunal samples recovered from the Cherokee Chota and Citico sites.

Frankel, Mark S. (American Association for the Advancement of Science)

[38] THE PROFESSIONAL SOCIETY ROLE IN PROMOTING ETHICAL CONDUCT

Promoting ethical conduct is not solely the responsibility of individual professionals. Professional societies have a vital role to play as well. A case will be made for a professional society responsibility to promote ethical conduct among its members. Specific recommendations for discharging of that responsibility will be offered, with some evaluation of their contributions to more effective ethical practices.

Freeman, L. G. (Chicago)

[2] MOUSTERIAN FACIES: IMPLICATIONS OF MORIN LEVEL 16

Excavations conducted at Cueva Morin (Cantabria, Spain) during 1968-69 produced some 307 "essential" (Bordes' term) retouched tools from an area seven square meters in extent. An immediately adjacent area of the same level measuring six square meters was opened during the excavation of an Aurignacian burial in 1970-71, yielded 227 more. Analyzed separately, these two partial assemblages would be assigned two different "facies," and the difference between them is statistically significant. In the case of Morin 16, at least, spatial segregation of tasks seems a greater probable contributor to the apparent "facies" difference than other factors.

Freidel, David (Southern Methodist) and Linda Schele (Texas)

[11] TLALOC WAR AND THE TRIUMPH OF THE CONFEDERACY AT CHICHEN ITZA

Tlaloc-Venus War is a gloss for a Maya military code aimed at the conquest and subjugation of rival kingdoms. Great Jaguar Paw of Tikal introduced the complex of foreign symbols and concepts legitimating Tlaloc war in his successful conquest of Uaxactun on January 16, 378 A.D. Later Classic kings used Tlaloc-Venus war, generating significant—if temporary—territorial hegemonies. The Terminal Classic Chichen Itza lords succeeded in establishing an enduring, large-scale conquest state using Tlaloc war. We attribute the Chichen Itza success to the replacement of the principle of royal dynasty with that of rule by council—*multeplal*.

Freter, AnnCorinne (Ohio)

[46] THE ROLE OF RURAL SETTLEMENT ANALYSIS AT THE MAYA CENTER OF COPAN, HONDURAS

The importance of rural settlement analysis in reconstructing the evolutionary processes among the Classic period Maya at Copan is considered. Based on data from six years of rural settlement survey and test pit excavations, and augmented by over 2,000 obsidian hydration dates, the settlement history of the Copan valley from 600-1200 A.D. is summarized. These regional settlement data are shown to significantly alter previous interpretations involving Mayan economic, social and political institutions as well as the growth and collapse of this complex society.

Freter, A. (see Evans, S.) [25]

Frison, George C. (Wyoming)

[47] PREHISTORIC HIGH PLAINS HUNTING STRATEGIES BASED ON MORTALITY STUDIES FROM FAUNAL REMAINS IN ARCHAEOLOGICAL SITES AND ANIMAL BEHAVIORAL STUDIES

Mammoth, bison, deer, pronghorn, mountain sheep and elk comprise most large mammal remains in High Plains archaeological sites. Except for mammoths, these species or closely-related sub-species are extant in their natural habitats. Mammoth procurement models using wild elephant behavior should be treated with caution but procurement of the other species can be understood based on their observable behavioral characteristics. This is overly simplified because animal behavior changes with age, sex, season, weather, etc. However, with sex, age, and seasonality data from sites, these can be combined with known animal behavior to provide more reliable prehistoric animal procurement models.

Frison, G. C. (see Miller, M. E.) [40]

Fritz, John M. (Sackler Gallery for Asian Art)

[10] IMPERIAL STYLE AND SYMBOLISM OF POWER: A SOUTH INDIAN EXAMPLE

Certain of the arts produced in empires are related to systems of meaning that constitute royal authority. Specific built forms and pictorial themes together with their contexts are symbolic forms which define the center of social action and link it to transcendent principles of order. During the Vijayanagara Empire (ca. 14th-17th centuries, south India) styles were evolved in urban layout, in civic and religious architecture, and in the decorative arts which asserted the sacred and generative roles of rulers. Here, evolving style can be ritually interpreted through indigenous texts and foreign visitor's accounts. Examples are briefly discussed.

Gaffney, V. (see Mees, G. C.) [16]

Gallison, J. D. (see Reid, K. C.) [17]

Gannon, Michael V. (Florida)

[44] DEFENSE OF INDIAN RIGHTS IN THE FLORIDA FRANCISCAN MISSIONS

On two notable occasions in the sixteenth century Franciscan friars in the Florida mission system took successful action to defend the human, civil, and religious rights of the native populations against the depredations of provincial governors. In the first instance they opposed Governor Diego de Rebolledo (1655-1659) and his practice of enslaving Apalachee natives as burden bearers to carry corn and other products one hundred leagues to the provincial capital of St. Augustine. Their protests to the King resulted in Rebolledo's removal from office and detention in Havana, where he died. In the second instance friars in the field defended native rights against similar outrages committed against them by Governor Juan Marquez Cabrera (1680-1687); as a result of their defense Marquez, too, was removed from office and held under arrest in Havana.

Garber, James F. (Southwest Texas State)

[25] EXCAVATIONS AT THE LATE CLASSIC MAYA SITE OF CHAC BALAM ON AMBERGRIS CAY, BELIZE: RESULTS OF THE 1988 FIELD SEASON

Chac Balam is located on the north end of Ambergris Cay and is ideally situated to have participated in the prehistoric long distance exchange routes. The site consists of a rectangular plaza group, approximately 135 meters east-west by 50 meters north-south. At the center of the site is a low plaza approximately 25 meters square. Adjacent to the site is a man-made canal which provides access from the coast to bay systems that lead to major population centers in the interior. Artifact analysis has provided valuable information on the shifts in trade affiliations as the site developed.

Garber, J. F. (see Guderjan, T. H.) [25]

Garcia-Arevalo, Manuel (Fundacion Garcia-Arevalo and Museo del Hombre Dominicano)
[22] TAINO-ARAWAK CULTURAL RESPONSES TO SPANISH ARRIVAL IN HISPANIOLA

The Taino-Arawak Indians of the greater Antilles were among the most complex and densely settled of the American chiefdoms encountered by the Spanish. Nevertheless, they had virtually disappeared within thirty years of Spanish contact in Hispaniola, victims of introduced disease, Spanish conflict, and slavery. Archaeological research in the Dominican Republic, however, has provided some insights into Amerindian acculturation and change in response to European presence before their demise. Some of these post-contact responses in Hispaniola are described using archaeological and ethnological data.

Garrison, Ervan G. (Texas A&M)

[50] RECENT ARCHAEO-GEOPHYSICAL STUDIES OF PALEOSHORELINES OF THE EASTERN GULF OF MEXICO

Geological mapping cruises conducted in 1987-88 in the Eastern Gulf of Mexico obtained detailed side-scan sonar and high resolution sub-bottom profiler data on paleoshorelines. Two relict shorelines have been tentatively identified at twenty and forty fathom depths below present sea level. In addition, buried stream channels have been identified entrenched within identifiable escarpments that still exist on the present seafloor in some areas. Preliminary results of analyses as to the age and origin of these paleoshorelines will be presented together with speculations as to their relationship to prehistoric settlement of the then sub-aerially exposed Outer Continental Shelf.

Gasco, Janine (Minnesota)

[4] DOCUMENTARY AND ARCHAEOLOGICAL EVIDENCE FOR HOUSEHOLD DIFFERENTIATION IN COLONIAL SOCONUSCO, NEW SPAIN

For colonial period Mesoamerica an understanding of household economic differentiation is best achieved through the combined use of documentary and archaeological data. Colonial wills and other documents containing household inventories provide information about material culture not readily available in the archaeological record alone. Not only are perishable materials (e.g., textiles, leather goods, and wooden objects) recorded in documents, but frequently the monetary values of household items also appear. This paper, which examines variability among households in colonial Soconusco, New Spain, illustrates how household inventories, together with archaeological data can be effectively used to study the colonial household economy.

Geddes, David (Kansas)

[43] MIDDLE NEOLITHIC CATTLE BUTCHERING AT VILLENEUVE-TOLOSANE (FRANCE)

Detailed analysis of frequency, location, orientation, morphology, and anatomical significance of cut and defleshing marks on exceptionally well-preserved remains of 25 domestic cattle, systematically butchered in one episode at the Neolithic site of Villeneuve-Tolosane (France), allows reconstruction of a carcass-processing sequence that included preliminary butchering (evisceration, skinning, disarticulation), meat-processing for smoking or drying, and marrow consumption. Skeletal part frequencies are modeled using Binford's MGUI index. High frequencies of mid-shaft cut marks parallel those from East African pastoral Neolithic and early hominid sites. Implications are drawn for the study of early hominid meat and marrow acquisition.

Gelburd, Diane (Soil Conservation Service)

[63] TECHNOLOGY, PEOPLE AND THE FUTURE OF CRM IN THE SOIL CONSERVATION SERVICE

As we approach the twenty-first century, technological and demographic changes are occurring at an ever-increasing rate. How can our cultural resource management (CRM) programs keep pace with the demographic trends and apply the new technologies? I address some of these changes and discuss ways to develop a strong CRM program for the twenty-first century using the Soil Conservation Service as an example.

Geneste, Jean-Michel (Direction des Antiquites Prehistoriques d'Aquitaine)

[24] THE DEVELOPMENT OF RAW MATERIAL PROCUREMENT ACTIVITIES IN SOUTHWESTERN FRANCE

New studies of Mousterian industries in southwestern France indicate the emergence of an organizational pattern in the different stages of manufacturing processes of lithic tools as early as the Middle Pleistocene. These systemized behaviors seem to be in close relationship with the ways of life of the human groups and principally within the constraints of their subsistence economies. The concept of anticipation appears to be remarkably related to the energy management of physical expenses coming about during regional group movements as well as to estimates of functional needs.

Gero, Joan (South Carolina)

[18] WOMEN AND STONE TOOLS

The assumption that it is males who produce stone tools is questioned. I begin by examining the gender-loaded meanings attached to the notion of "stone tool" and the contemporary intellectual context in which stone tool production is perceived as a male activity. An argument is presented for women as likely stone tool producers. Finally, archaeological data from highland Peru are interpreted as showing a shift towards greater participation by women in the process of stone-tool production after the Early Horizon.

Gersbach, E. (see Arnold, B.) [48]

Gifford-Gonzalez, Diane (UC-Santa Cruz)

[47] EXAMINING AND REFINING THE KLEIN CROWN HEIGHT METHOD OF AGE ESTIMATION

In applying the method developed by Richard Klein to estimate age-at-death from individual teeth of cattle, I encountered problems that led me to undertake cross-checks with known-age dental samples. This paper reports on the results of these checks and offers some suggestions for refining the method.

Gilbert, Allan S. (Fordham)

[15] THE CATTLE OF MEKETRE: MODELS FOR MODEL BUILDING

When the Middle Kingdom Theban noble Meketre died some time after 2,000 B.C., three of the wooden tomb models interred with his body depicted activities associated with the care, feeding, and slaughter of cattle. Assuming accuracy of sculptural detail, the cattle models provide much information relevant to ancient Egyptian beef production, including aspects of selection for slaughter, pastoral accounting, growth rates, finishing schedules, butchering procedures, and the handling of meat and blood. While zooarchaeologists have rightly been cautious in interpreting animal exploitation through representation alone, the present case shows how informed investigation of such art can yield detailed hypotheses, osteological implications of which may be tested against relevant faunal assemblages.

Girard, Jeffrey (Southern Methodist)

[54] SYSTEM DEFINITION AND HISTORIC ARCHAEOLOGICAL SITES NEAR TAOS, NEW MEXICO

Recent investigations of small historic archaeological sites situated between Taos and Picuris Pueblos in northern New Mexico have been directed toward exploring ways of making mutual sense of the historical and archaeological pasts. It is argued that this is best approached through organization of historical data to reflect patterns of production and use of material goods, rather than through traditional attempts to organize archaeological data to reflect historic cultures. Archaeological and historical data from the study area are discussed in terms of three systems of organization: the town system, the rancheria system, and the camp system.

Glanzman, William (MASCA-Pennsylvania), Joyce C. White (Pennsylvania) and Ann Rufo (Hospital of the University of Pennsylvania)

[3] POTTING TRADITIONS AND THEIR ROLE IN INTERPRETING REGIONALISM IN NORTHEAST THAILAND: THE EVIDENCE FROM BAN CHIANG

A combination of technological analyses of pottery, especially addressing manufacturing methods, from the site of Ban Chiang in northeastern Thailand have revealed three major technological stages of development during the site's occupation (ca. 3,000 B.C.-A.D. 200). A decrease in the number of manufacturing methods occurs simultaneously with other material culture developments. The ceramic data suggest either a "household industry" or "individual workshop" production level, and reflect at least two potting traditions. Only one of these traditions has been documented elsewhere in the region. This emerging picture suggests a complex set of factors is involved in ceramic production, including craft specialization, exchange, regionalism and ethnicity.

Glanzman, W. (see Rufo, A.) [39]

Glass, Margaret (Calgary)

[34] THE HORSE IN NEOLITHIC CENTRAL EUROPE

The role of the horse in the Neolithic of western and central Europe is difficult to interpret because of the low frequencies of equid remains in sites. The Galenberg, an enclosed-ditch site of the early third millennium B.C. in southern Germany, has yielded a faunal assemblage in which horse is the dominant large mammal. Analysis of this unusually large collection provides a better idea of the relative importance of horse in the economy and subsistence of this period and facilitates comparison with contemporaneous cultural groups of eastern Europe.

Glassow, Michael A. (UC-Santa Barbara)

[38] ETHICAL ISSUES BROUGHT ABOUT BY THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

The implementation of the California Environmental Quality Act in the 1970's has resulted in perhaps the highest density of contract archaeologists in the nation. The business atmosphere in which most of California archaeology is now done has resulted in the erosion of ethical standards concerning the quality of archaeological investigations, the nature of competition between contractors, and the dissemination of information to the profession and the public. Suggested remedies are the development of more explicit guidelines for contract work, the establishment of consortia of local archaeologists

who meet to discuss research goals, and the involvement of academic institutions in fostering high standards of performance and disseminating information through publication.

Gleason, Kathryn (Pennsylvania)

[16] GARDEN EXCAVATIONS AT THE HERODIAN WINTER PALACE, JERICHO

Herod the Great's winter palace complex at Tulul Abu El-alayiq, near Jericho, includes a formally laid-out wing providing entertainment facilities: baths, dining rooms, promenades, pools and a variety of gardens. This paper presents the archaeological evidence for two small courtyard gardens and a monumental sunken garden. The range of evidence includes stratigraphy, archaeobotanical and faunal remains, archaeometrical analysis of flower pots found *in situ*, as well as literary and artistic descriptions of these and contemporary late Hellenistic gardens. The evidence gives a clear look at the construction of these gardens and a tantalizing glimpse of their former beauty.

Goldstein, Paul (Chicago)

[6] TOWN PLAN AND DOMESTIC FUNCTION IN A TIWANAKU PROVINCIAL CENTER: THE CASE FROM OMO, SOUTHERN PERU

Until recently, very little has been known about residential plan and domestic patterning of the Tiwanaku culture outside of its altiplano homeland. Extensive mapping and excavation of eight houses at the Omo site in 1986-87 have shed new light on the spatial and social patterning of Tiwanaku's administrative center in Moquegua during Tiwanaku Phases IV and V and the local (Post-Expansive) Tumilaca Phase. The relevance of the town plan, domestic construction, and household features and contents to the economic and social development of Tiwanaku's mid-elevation provinces will be discussed.

Gomez-Pampa, Arturo (UC-Riverside)

[26] THE MANAGEMENT OF MAYA FORESTS

A review of the present knowledge on the vegetation of the lowland Maya area is presented with special emphasis on the forests. The traditional management of forests in the Yucatecan Maya area is described as is its impact on the present day vegetation. Some ideas are given on the past management of forests based on the recently found cacao groves in the state of Yucatan and on the role of forest gardens in Maya subsistence.

Gonlin, Nancy (Pennsylvania State)

[46] RURAL OCCUPATION OF THE CLASSIC MAYA AT COPAN

Rural excavations at Copan, Honduras have provided insight to the character of small peripheral domestic sites in the Maya area. The determination of the function of each site through artifactual and architectural data and the control of chronology through obsidian hydration dating both allow for a reconstruction of the relationship between the urban and rural zones during and after the Classic Period. Sites of similar size in each zone of Copan are analyzed to underscore differences and similarities between the core and the hinterland.

Gonzalez, Rebecca (INAH)

[35] ARCHAEOLOGICAL INVESTIGATIONS AT LA VENTA: 1984-1988

Since 1984, INAH has conducted a program of research, protection, and restoration at La Venta, Tabasco. To date, the project has completed mapping of La Venta Island, and undertaken excavations in residential and ceremonial sectors of the site. Although Early Formative materials have been recovered from outlying portions of the island, the site core is almost exclusively of Middle Formative occupation. During the 1988 season, the base of mound C-1 was excavated, locating previously known monuments, one new stela, and other fragments. Architectural features, such as alignment of limestone slabs at the base of the mound were also encountered.

Goodwin, C. M. (see Yentsch, A.) [16]

Goodyear, Albert C. (South Carolina Institute of Archaeology & Anthropology)

[64] TRENDS AND PATTERNS IN PALEOINDIAN RESEARCH IN THE SOUTHEASTERN UNITED STATES

Because of the great density and variety of Paleoindian lanceolate points found there, the southeastern United States has figured prominently in archaeological thinking about Paleoindian in the east. However, little progress has been made in finding sites with stratified depth and integrity to enable dating of point types, assess site functions, and to evaluate subsistence. Recently, research in geology and palynology provides some explanation for this lack of deposition. Progress continues in mapping points, studying raw materials and probable geologic sources, and environmental associations, all of which provide grounds for speculating about Paleoindian settlement and demographic trends.

Gordon, Bryan C. (*Canadian Museum of Civilization*)

[30] **ARCHAEOLOGICAL TOOTH AND BONE SEASONAL INCREMENTS: THE NEED FOR STANDARDIZED TERMS AND TECHNIQUES**

Variable methods and terminology confuse researchers attempting to determine season and age-of-death of animals from bone and tooth increments. Increasing use by archaeologists of seasonally-deposited light and dark microscopic lines in dental cement and dentine and bone periosteum demands a standard method and terminology. A thin-section preparation equally suitable for fresh or fossilized specimens is described, using "opaque and translucent increments" as preferred terms.

Gordon, B. C. (see *Meadow, R. H.*) [30]

Goss, A. F. (see *Heilman, J. M.*) [78]

Graham, Mark Miller (*Utah*)

[75] **THE SIGN OF THE JAGUAR: STONE SCULPTURE AND INTER-ELITE COMMUNICATION IN PERIOD VI LOWER CENTRAL AMERICA**

The profusion of feline imagery in the stone sculpture of Costa Rica and Panama in Period VI (A.D. 1000-1550) is explained by reference to the jaguar as a sign of lordly power, and by special reference to local participation in long-distance exchange of gold with Mayan Mesoamerica. Atlantic Costa Rican metate-thrones belong to a late art horizon extending into Panama. One node of iconographic influence is the stone sculpture of San Agustín, Columbia, and a northern zone of affiliation is typified by the jaguar thrones of Chichén Itzá, whose Sacred Cenote was a terminus of southern gold.

Granger, Joseph E. (*Louisville*)

[19] **CULTURE, CONTINUITY AND CUYLERVILLE: AN INQUIRY INTO THE ARCHAIC-WOODLAND INTERFACE IN THE GENESSEE RIVER VALLEY OF CENTRAL NEW YORK**

Piffard, Wary, Scaccia and Cuylerville are "classic" sites of the Late-Terminal Archaic and Early-Middle Woodland in New York's Genessee River Valley at Cuylerville. Technological and structural similarities observed from the recent analysis of the lithics, features, burials and catchment of this site-cluster suggest demonstrable behavioral patterns and continuities within and between sites of this locality. These patterns duplicate other similarly situated clusters in New York, Ontario and Quebec. Such pattern recognition assists understanding of the cultural continuity of sedentary Archaic-Woodland peoples logistically utilizing for long periods, grouped components in single localities of the Northeast.

Graves, Michael W., Terry Hunt (*Hawaii*) and Darlene Moore (*Consultant*)

[74] **CERAMIC PRODUCTION AS A MEASURE OF LATE PREHISTORIC INTERACTION IN THE MARIANA ISLANDS**

Archaeologists have made substantial progress in characterizing temporal variation in ceramic production throughout nearly 2,000 years of prehistory in the Mariana Islands. We have yet to similarly consider spatial variation in pottery production. Morphological analyses of pottery show that its manufacture in the Islands have diverged into two traditions by A.D. 1200. Compositional analyses of pottery were conducted to confirm this pattern and to determine production locales. The results of these studies are viewed within the context of late prehistoric society in the Mariana Islands in which there was increased competition for resources and intensification of labor.

Graves, Michael W. (*Hawaii*) [Discussant 3]

Graves, M. W. (see *Hunt, T.*) [74]

Grayson, Donald (*Washington*) [Discussant 51]

Grayson, Donald (*Washington*) [Discussant 30]

Green, Stanton (*South Carolina*) and Marek Zvelebil (*Sheffield*)

[9] **FARMING AN ISLAND: THE DEVELOPMENT OF AGRICULTURAL SOCIETY IN PREHISTORIC IRELAND**

Until the mid 1970's early Irish prehistory was understood to be limited to its northeast provinces, while the southern two-thirds of the island was believed to be uninhabited until the Bronze Age. We now have evidence for an early post-glacial Mesolithic and Neolithic settlement for the entire island. Study can begin of the evolution of prehistoric Irish society from the time of its colonization by hunter-gatherers to subsequent development of agricultural society through the adoption of novel domestic resources into the economy. Of particular interest is Ireland's position as a frontier island,

indicated by its unique later-Mesolithic (6,000-3,500 B.C.) lithic industry, and the effect of these geographic and historic factors on the subsequent adoption of farming during the fourth millennium.

Greenfield, Haskel (*Indiana*)

[9] **THE SOCIO-ECONOMIC TRANSFORMATION OF SOUTHEASTERN EUROPE IN THE FOURTH MILLENNIUM**

During the fourth millennium new, complex socio-political hierarchies emerged, agriculture is transformed by the introduction of the plow, wagon, and tract animals, and animal husbandry increases in importance with the introduction of secondary products and transhumance. By the end of the millennium, the socio-political and economic adaptations that so familiarly dot the ethnohistoric landscape of southeastern Europe are recognizable. Archaeological data from the Central Balkans are used to trace the emergence of a recognizably Southeast European culture during this crucial era.

Gregg, Susan A. (*Washington*)

[9] **THE "SECONDARY COLONIZATION" OF EUROPE: THE ALPINE FORELAND IN THE FOURTH MILLENNIUM**

Farmers expanded into the Alpine Foreland in the fifth millennium B.C. and settled primarily on loess soils. During the fourth millennium a so-called "secondary colonization" occurred in which farming villages were established on the heavier, less easily worked glacial soils. These villages have a strikingly different organization, a more diverse artifact assemblage, and what appears to be a more generalized subsistence economy. This paper examines the economic strategies of the "secondary" colonizers and reviews the state of current research.

Gremillion, Kristen J. (*North Carolina*) and Cecil R. Ison (*USFS-Daniel Boone*)

[27] **TERMINAL ARCHAIC AND EARLY WOODLAND PLANT UTILIZATION ALONG THE CUMBERLAND PLATEAU**

Evidence from Cold Oak Shelter and other sites in Eastern Kentucky indicates that the basic elements of a gardening complex utilizing cutigen sumpweed, pepo squash and perhaps small grains were in place by the Terminal Archaic. However, only in the Early Woodland is there evidence of harvesting of large quantities of a morphologically altered domesticated (thin-testa chenopod). The well preserved plant remains from the dry rockshelters provide a more accurate record of nut utilization than open sites.

Gresham, Thomas (*Southern Archaeological Services, Inc.*)

[81] **A SETTLEMENT STUDY IN THE UPPER JUBBA RIVER BASIN, SOMALIA**

Continued survey and limited testing were conducted in late 1988 along the Jubba River in southern Somalia. About 800 sites, ranging from Middle Stone Age lithic scatters to recent Islamic cemeteries, have been recorded in a proposed 200 kilometer long reservoir basin. A sample of the 500 open air sites was tested, twenty-five caves and rockshelters were documented (over half were tested), polychromatic rock art at ten rockshelters was traced and described, and a large number of rock cairns and cemeteries were recorded and a small sample tested. Middle Stone Age material dominates the site assemblages but Late Stone Age material is also prevalent. Variation in the assemblages is described and possible explanations are proposed.

Griffin, John W. (*Southeastern Frontiers, Inc.*)

[44] **CHANGING PERSPECTIVES ON THE SPANISH MISSIONS OF LA FLORIDA**

Current research on the Spanish missions of the Southeast reflects the maturing of two disciplines, historical archaeology and documentary history. A half century has seen archaeologists and historians move from indifference to each other, through a period of mutual disrespect, to a recognition of the interdependence of the data sources employed and toward the development of cooperative approaches. This bit of intellectual history is traced and examined.

Griffin, P. Bion (*Hawaii*)

[3] **RETHINKING PHILIPPINE PREHISTORY**

Philippine prehistory is largely a mythology constituted from folk beliefs, colonial degradation and ill-conceived archaeology. Only recently have foreign and Filipino archaeologists begun to develop modern research designs and free themselves from the dominant mythology. American orientations continue, however, to guide the latest inquiries. Modern ecological and processual questions seem fruitfully raised, and old interests are best recast. The processes of the peopling of the archipelago, the florescence of Malayo-Polynesian speaking horticulturalists, and an ethnohistorically glimpsed social complexity need to be understood. Archaeologically testable models, based on ethnoarchaeological research, are considered.

Grimm, Linda T. (Oberlin)

[17] SITE STRUCTURE AND FORMATION PROCESSES IN THE UPPER PALEOLITHIC AT SOLVIEUX: EVIDENCE FROM LITHIC REFITTING

A recent spatial analysis of horizontal patterning in a Perigordian level from the Upper Paleolithic open-air site of Solvieux (Dordogne), using K-means cluster analysis and lithic refitting, indicates the presence of overlapping palimpsests of discrete knapping events with some subsequent mixing. The isolation of processes that were involved in the formation of this deposit is attempted by focusing on the problems of palimpsest definition and relationships. This will be approached through the analysis of production sequence data considered in concert with core reduction technology, raw material type, nature of tool production, feature associations and vertical artifact distributions.

Grove, David C. (Illinois)

[75] JADE USE, THE OLMEC QUESTION AND INTER-REGIONAL INTERACTION

The identification of various Formative period Central American jade/greenstone objects as "Olmec" has strongly influenced interpretations of the prehistory of both Mesoamerica and the Intermediate Area. Reexamination and reanalysis of data on jade-greenstone use, distribution, and chronology, together with new understandings of the iconography, is presented. Current Olmec-centric interpretive models are suggested to be incorrect, and the data are reinterpreted in terms of social contexts, shared symbols of chiefly power, and inter-regional exchange patterns.

Grove, David C. (Illinois) [Discussant 35]

Grzybowski, Susan D. (SUNY-Stony Brook)

[68] A REEVALUATION OF PREHISTORIC LAND USE ALONG THE OUTER COASTAL PLAIN AS EXEMPLIFIED BY LONG ISLAND

Archaeological research incorporating ecological models for predicting site locations have considered the Outer Coastal Plain as having limited resource productivity. As a result of low expectations, site surveys have been extremely limited. Recent archaeological survey data collected along the Outer Coastal Plain of southern Long Island indicates that these ecological models have led to an underestimation of prehistoric exploitation. Spatial analysis of prehistoric sites, natural resources, and topographic configuration in this area demonstrates that along the Outer Coastal Plain prehistoric land use is independent of resource productivity. In addition, this research suggests a correlation between observed topographic projections and site location.

Guderjan, Thomas H. (Texas Institute of Texan Cultures-San Antonio), James F. Garber (Southwest Texas State) and Lisa Brody (City University of New York)

[25] AN INITIAL REPORT ON CHAN CHICH AND OTHER SITES IN NORTHWESTERN BELIZE

Chan Chich is a medium sized, Late Classic center consisting of at least 12 plazas near the Rio Bravo. In 1988 the site core was mapped and information from looters' trenches was compiled to determine the site's construction history. Additionally, initial maps of Las Milpas and other sites were compiled. This pilot project has led to a commitment to a long-term survey, mapping and excavation project in the area.

Guenther, T. (see Kornfeld, M.) [54]

Guilbaud, M. (see Backer, A.) [51]

Gums, B. L. (see Brown, A.) [60]

Gunn, Joel (Texas-San Antonio)

[65] GLOBAL CLIMATIC CHANGE AND ARCHAEOLOGY: YEARS OF FUTURE PAST

Analysis of extensive data collected since the IGY year 1958 indicates important relations between annual average temperature of the global atmosphere and regional hydrological balance. Models of global-regional climate derived from these data can be used to project climates into the past and future. Regional impacts of past climatic episodes warmer than the present, such as the Little Climatic Optimum (A.D. 900-1200), can be used to assess potential impacts of future greenhouse warming.

Habicht-Mauche, Judith A. and Winifred Creamer (School of American Research)

[53] ANALYSIS OF ROOM USE AT ARROYO HONDO

Data on architectural features and artifact distribution from a single roomblock at Arroyo Hondo Pueblo (LA12) have been examined. Roomblock 16 at Arroyo Hondo spans both the early (ca. A.D. 1300-1350) and late (ca. A.D. 1360-1420) components. Variables such as room size, floor features, room connections, and rooftop work areas are analyzed in conjunction with artifact distributions to determine both individual room function as well as household structure within the roomblock as a whole.

Habicht-Mauche, J. A. (see Leventosky, A. A.) [32]

Hahn, Joachim (Tubingen)

[51] INTERASSEMBLAGE VARIABILITY OF THE AURIGNACIAN IN CENTRAL EUROPE

The Aurignacian in Central Europe differentiates into two different facies: open-air sites that are dominated by a single faunal species, reindeer (Lommersum, Breitenbach), and have few bone tools; and cave sites that have varied faunal assemblages and are rich in bone and antler tools as well as beads and art objects. Different activities, seasonal occupations and general site functions produce assemblages which cannot be interpreted as being chronologically or culturally distinct.

Hall, Barbara A. (Connecticut) and Barbara L. Stark (Arizona State)

[4] CERAMICS AND SOCIAL DIFFERENTIATION AMONGST PREHISTORIC HOUSEHOLDS IN LA MIXTEQUILLA, VERACRUZ, MEXICO

A program of intensive survey, collection, and excavations in the Mixtequilla region of southern Veracruz has defined a dense residential occupation interspersed with numerous ceremonial centers, comprising a long occupation span. Excavations in one Terminal Classic period mound uncovered remains of a domestic structure collapsed on a deposit of serving vessels and elite and imported household wares. This material is compared with surface collections from residential mounds, in relation to such factors as occupation period, mound size and height, and distance to nearest center, in order to define the nature of social differentiation throughout the Mixtequilla region.

Hall, Charles L. (Tennessee)

[52] INVESTIGATING ARCHAIC SETTLEMENT IN MIDDLE TENNESSEE

Data derived from extensive non-site surface survey are used to explore Middle and Late Archaic settlement pattern dynamics along the Duck River in Middle Tennessee. The separate tasks of site definition, temporal determination, and assemblage composition comparison, are discussed as they relate to the primary goal of discovering factors effecting settlement location. A strictly quantitative approach is employed to assess both the gravitational effect of discrete features of the landscape, and the degree of fit between empirical spatial patterns and those predicted by optimization models.

Hally, David J. (Georgia), Marvin T. Smith (Lamar Institute) and James B. Langford, Jr. (The Coosawattee Foundation)

[1] THE ARCHAEOLOGICAL REALITY OF DE SOTO'S COOSA

According to the de Soto narratives, the province of Coosa consisted of at least eleven named towns and groups of towns and required 24 days to traverse. According to archaeological evidence, the province consisted of eight spatially distinct clusters of sites. These clusters had a number of common features, including geographical size, number of component sites, and ecological setting. Most seem to be the end product of distinctive ceramic micro-traditions suggesting that they were loosely incorporated into the province. Province integration may be indicated by the geographical distribution of certain status items found in burials.

Hamilton, Nathan D. (Southern Maine)

[77] LATE WOODLAND OCCUPATIONS IN RIVERINE AND COASTAL SOUTHWESTERN MAINE

Late Woodland occupations in southwestern Maine are generally poorly known in riverine and coastal settings. Recent excavations at the Riverine Pejepscot and coastal Great Moshier Island sites provide a temporal framework for local cultural assemblages as well defined activity areas. The Late Woodland lithic and ceramic assemblages reveal considerable diversity in manufacture technology and style. A comparison of riverine and coastal assemblages are presented that further relates these manifestations to the broad Gulf of Maine.

Hammond, Norman (Boston) [Discussant 11]

Hancock, Ronald G. V. (Toronto)

[39] NEUTRON ACTIVATION ANALYSIS: IS IT OF ANY REAL USE TO ARCHAEOLOGY?

The general principles of neutron activation analysis (NAA) will be discussed briefly, with emphasis on the advantages and limitations of the technique. The usefulness of applying NAA to studies of a broad spectrum of archaeological materials, and hence, to try to answer a range of archaeological questions, will be addressed. Specific problems developing from the analysis of materials such as bone, copper, and pottery may provide food for thought.

Hann, John H. (*San Luis Archaeological and Historical Site*) and Gary Shapiro (*Bureau of Archaeological Research, Florida Dept. of State*)

[44] THE DOCUMENTARY IMAGE OF THE COUNCIL HOUSES OF SPANISH FLORIDA TESTED BY EXCAVATIONS OF THE COUNCIL HOUSE AT SAN LUIS DE TALIMALI MISSION

In the missionized provinces of Spanish Florida the council house was far and away the most impressive structure and perhaps the one that was most frequented by both the native and the outsider during the mission era. Consequently, it is the building for which we have the most detailed descriptions both of the structure itself and of the activities it housed. In 1985 and 1986 the first significant exploration of a mission-era council house was conducted at the San Luis de Talimali site. Images of the council house as reflected by the documents and by the excavations are presented and compared.

Hansell, Patricia (*Temple*)

[56] INTERPRETING DEFLATED FEATURES OF THE PAST: INTRASITE PATTERNING IN A MULTI-COMPONENT SITE FROM CENTRAL PANAMA

Extensive archaeological research at the 218 hectare site of La Mula-Sarigua, Central Pacific Panama, has yielded evidence for considerable intrasite variation—variation which is the product of perhaps 10,000 years of occupation. An analysis of the density and distribution of the evidence indicates that, despite a largely eroded and deflated context, size, age, function and internal patterning can be discerned. The goals of this paper are threefold: 1) to outline the mapping techniques used in delineating the density and distribution of materials, 2) to describe the clusters recognized and 3) to interpret internal organization relative to the growth and collapse of settlement at La Mula-Sarigua.

Hanson, G. (*see Rippeteau, B.*) [63]

Hard, Robert J. and William Merrill (*Smithsonian*)

[8] MOBILITY AND SEDENTISM AMONG THE TARAHUMARA

The Tarahumara Indians in southern Chihuahua, Mexico currently have a mobile settlement system which makes use of winter, summer and field residential locations. While most households in the valley we examined change residences during the year some remain sedentary. We investigate the role that access to natural resources, agricultural fields and care of domestic animals play in conditioning this variability. Implications for understanding mobility and the emergence of sedentism in prehistoric systems are discussed.

Harkins, O.F.M., Conrad (*St. Bonaventure*)

[44] ON REMOVING SAND FROM OUR BROTHERS' GRAVES: THE INTEREST OF MODERN FRANCISCANS IN UNCOVERING THE TRACES OF THE FRANCISCAN PROVINCE OF SANTA ELENA

With the 1763 evacuation of a few remaining friars from St. Augustine ended one of the first systematic efforts to bring Christianity to the native population of the future United States. As part of that effort, five friars had given their lives in 1597 on St. Catherines and St. Simons Islands and the nearby Georgia mainland. One Franciscan here investigates questions related to the "martyrdom": 1) were the natives sufficiently exposed to Christian teaching to contest doctrine; 2) was their action against the friars merely a civil revolt; and 3) did the missionaries provoke their fate by an imprudent use of authority?

Harmon, M. A. (*see Radisch, W. H.*) [27]

Harmon, M. A. (*see Snedeker, R. J.*) [33]

Harpending, H. C. (*see Wood, J.*) [57]

Harrold, Francis B. (*Texas-Arlington*)

[51] FUNCTIONAL LITHIC VARIABILITY IN THE UPPER PALEOLITHIC PERIGORD

In the Upper Paleolithic of Cantabrian Spain, Straus (1986) has reported a consistent dichotomy between lithic assemblages dominated by burins and backed blades, and those dominated by scrapers and denticulates. This pattern crosscuts "cultural stages," such as the Solutrean and Magdalenian, and he suggests its relation to persistent patterns of functionally differentiated site use. I report on a review to determine whether the same (or analogous) patterning in assemblage variability exists in the Upper Paleolithic record of the Perigord region of southwestern France. Implications for understanding interregional lithic variability and traditional typological analysis are discussed.

Hart, J. P. (*see Doershuk, J.*) [71]

Hartzell, Leslie L. (*UC-Davis*)

[37] BUENA VISTA LAKE: FURTHER INVESTIGATIONS INTO "LACUSTRINE ADAPTATIONS"

Lacustrine environments have long been regarded as optimal (i.e., highly ranked) habitats for hunter-gatherers because of their stable, diverse, and abundant resources. More recently, however, it has been argued that lakes and lake margins do not provide that stable, rich resource base once assumed. In consideration of this debate archaeological investigations were recently conducted in the vicinity of Buena Vista Lake in the southern San Joaquin Valley of California. The lake microenvironment has played a significant role in the adaptive strategies of hunter-gatherer populations occupying the area over the past 8,000 years. Analysis of data generated from this study, when considered in light of a reanalysis of previous local research, suggests that the inherent qualities of the lake environment cannot wholly account for the patterns seen. It is argued that the use of lacustrine resources is tied to such features of human organization as technology, scheduling of resource use within an area, and ultimately population density.

Hassan, Fekri (*Washington State*)

[65] GEOARCHAEOLOGY OF NILE FLOODS AND GLOBAL CLIMATIC CHANGE

Geoarchaeological investigations of the origins of civilization in Egypt have produced a detailed analysis of Holocene Nile floods. Comparison with paleoclimatic data from the Sahara and Europe reveal distinct teleconnections. The emerging model of climatic controls of Nile floods may thus serve as a guide for coping with contemporary and future climatic changes. Investigations have also focused on the impact of Nile floods on economy and settlement strategy in a framework of environmental psychology, subjective probability and decision making under uncertainty. Interpretation of human responses in the past provides a basis for evaluating current and possible future reactions to climatic crises.

Hastings, Charles M. (*Central Michigan*)

[42] INTENSIFIED ARCHAEOLOGICAL SURVEY IN THE CENTRAL PERUVIAN MONTANA

A preliminary assessment of 1988 fieldwork in Peru's Chanchamayo Province is presented. This was the first season of a follow-up survey in an outer range of heavily forested mountains of the Eastern Andes. Coverage was concentrated between 1200-2200m in a small area recognized from previous studies as part of a boundary zone between highland Andean and tropical lowland cultures during late prehispanic periods. Three ceramic complexes appear to be present: one Andean, a second lowland, and a third of unclear origin. Continuing study of these complexes will better determine the extent of colonization from both directions within this frontier.

Hastorf, Christine A. (*Minnesota*)

[18] FOOD AND GENDER IN PREHISTORY

In most societies the family, centered around adult females and males, is the unit of production and distribution. Relations within the family, through divisions of labor and access, negotiation, production, and reproduction, create gender through actions but also through the use and placement of material in the residence. If gender is created in the daily living quarters and a main occupation of the household is to feed its members, then food should be a significant medium for determining and maintaining gender relations. Ways to study social relations in the past through the food system and its depositional correlates will be discussed and illustrated with archaeological data from the Peruvian Andes.

Hatch, James W. (*Pennsylvania State*)

[36] LAMAR PERIOD FARMSTEADS IN PIEDMONT GEORGIA

Recent research has demonstrated that a major population increase occurred in the upper Oconee River drainage (DeSoto's "Ocute" Province) during the 16th century, a period of major cultural transformations among chiefdoms in the interior Southeast. Estimates of the number of Lamar Period sites in the region are in the tens of thousands, most of these being single family habitations in non-riverine settings. The ongoing research context and substantive results of the past two years of research on non-riverine (upland) sites are described, none of which had been thoroughly excavated prior to 1987. The critical role of these sites in our understanding of regional demographic and economic changes during the Contact Period is discussed.

Hauff, Phoebe L. (*CSES/CIRES-Colorado*)

[75] ADVANCES IN MINERALOGICAL STUDIES OF JADE

For a mineralogical evaluation of Mesoamerican and Central American jadeites a complex analytical scheme including X-ray diffraction and fluorescence (energy dispersive and wavelength dispersive),

reflectance spectrometry, transmitted light and scanning electron microscopy, and trace element isotopes was designed. To implement this study, a new X-ray instrument has been developed. This is a spectrometer with a custom sample chamber which allows non-destructive testing of entire artifacts and which simultaneously collects both mineralogical and elemental data from artifacts and natural samples. Although this very unique tool will initially provide valuable new data sets for the characterization and source evaluation of the enigmatic Central American jades, it can be utilized for any crystalline materials. Its potential applications to archaeological studies are far reaching.

Hayden, Brian D. (*Simon Fraser*) [Discussant 46]

Haynes, Gary (*Nevada-Reno*)

[47] MEGAMAMMAL AGE PROFILES: MEANING OR AMBIGUITY?

With wild animals, especially the megamammals, different mortality (age) profiles result from different causes of death, although trends in population growth or decline also affect the profiles. Age profiles from fossil collections may or may not clearly reflect human selectivity in preying on game populations. African elephant death samples (noncultural or cultural in origin) are characterized by three or four distinctively shaped mortality profiles. Profiles seen among large samples of free-roaming black rhino, Cape buffalo, American bison, and feral *Camelus* differ greatly when selective predation or environmentally caused mass kills account for deaths.

Haynes, John (*WAPORA, Inc.*)

[45] THE DULLES SITES: PROPOSED HIGHWAY CORRIDORS REVEAL LATE ARCHAIC SPATIAL ORGANIZATION

Cultural resources survey for a proposed highway in Northern Virginia has generated about 40 miles of Phase I survey and Phase II testing of 17 archaeological sites during the assessment of three alternative alignments. Significant Late Archaic period sites have been found. Among these are a site including evidence of a large structure and a related special activity site. These sites, other sites covered by the highway project, and previous surveys of adjacent areas hold evidence of intensive occupation of the area. Investigations there have shown a surprising degree of sedentism for a minor tributary drainage. In contrast, the accepted view has been that semi-permanent settlements existed only on major river bottoms, where evidence for structures has been scarce.

Heckenberger, Michael J. (*Pittsburgh*), James B. Petersen (*Maine-Farmington*) and Louise A. Basa (*New York Department of Environmental Conservation*)

[19] EARLY WOODLAND PERIOD RITUAL USE OF PERSONAL ADORNMENT AT THE BOUCHER SITE

Recent analyses of artifacts and mortuary practices at the Boucher cemetery (VT-FR-26) in northwestern Vermont have produced unique data about the ritual use of personal adornment in mortuary contexts during the Early Woodland period. Many interments included lavish amounts of copper beads and marine shell beads and ornaments. The copper artifacts created unusual conditions of preservation which enabled recovery of highly perishable artifact categories, including basketry or fabrics, cordage, and hide specimens. Emphasized are the artifact categories related to personal garmentry and ornamentation and the spatial relationships of these artifacts to individual interments. Taken in concert, these analyses are used to reconstruct site-specific mortuary practices and broader regional patterns.

Heckenberger, M. J. (see Petersen, J. B.) [19]

Heilman, James M. and Arthur F. Goss (*Dayton Museum of Natural History*)

[78] SUNRISE AT SUNWATCH

SunWatch (33MY57) is a 12th century Fort Ancient village in Dayton, Ohio. Eighteen years of excavation within the circular stockade has revealed a rigid patterning of concentric rings of houses, cache/trash pits, and burials around a central plaza, which is dominated by a center post complex. Unlike many astroalignment sites, the documented planting, harvesting, and solstice alignments are supported by the cultural data. The excavation and analysis have allowed a more complete understanding of the alignments. The ongoing excavation, village reconstruction, and opening of the Museum allows the public to see how these farmers scheduled their activities by "Living the Sky."

Henrickson, E. (see Nicholas, I. M.) [46]

Henrickson, Robert C. (*Royal Ontario Museum*)

[81] NOT-SO-URBAN RENEWAL: NEIGHBORHOOD DEVELOPMENT AND SUCCESSION IN A BRONZE AGE IRANIAN TOWN

Analysis of architectural remains and associated artifacts from a large-scale exposure (700 square meters) of deeply stratified Period III (2,600-1,400 B.C.) deposits at Godin Tepe in western Iran has defined long-term changes in the nature of, and activities within, a portion of the settlement. Differing ranges of activities coupled with repeated architectural changes, replacements, and localized abandonments contrast with the persistent overall neighborhood structure defined by road paths and building orientations. Other smaller clearances suggest the changing relationship of this area to the rest of the settlement. Regional survey data define the evolving roles of this central settlement within the Kangavar Valley.

Henry, Donald O. (*Tulsa*)

[2] TRANSHUMANCE DURING THE LATE LEVANTINE MOUSTERIAN

Evidence from two nearby, but elevationally distinct rockshelter sites is presented to support an argument for transhumance in the mountains of southern Jordan during the Late Levantine Mousterian (i.e., some 60-50,000 years ago). The elevations, settings, exposures, artifact densities, reduction strategies, and raw material procurement patterns of the sites are compared and contrasted. The high elevation (1,300m) site of Tor Sabiha is argued to have represented a transitory warm season camp, whereas the lower elevation (900m) site of Tor Faraj is interpreted as a longer term cold season occupation. Furthermore, it is suggested that opportunistic "foraging" and logistically structured "collecting" procurement strategies were governed by the season of occupation.

Herrgott, Sherry (*Maricopa County Superior Court, Arizona*)

[23] PROTECTING THE RESOURCES: THE BROAD PROSPECTIVE

The experiences of the last ten years of resource protection legislation should guide our future effort. Site protection must be made a priority within each responsible agency. More lawyers trained in the law are needed to complete the teams with archaeologists and law enforcement agents who have obtained such training. The civil aspect of the law which is rarely utilized, should be pursued. Still, the best protection may be prospective and volunteer monitoring programs as well as education of young people which may provide the best vehicle for future resource protection.

Hesse, Brian (*Alabama*) and Paula Wapnish (*Smithsonian*)

[15] THE ANIMAL WORLD OF ANCIENT CANAAN: ZOO-IDEOLOGY AND ZOO-POLITICS

The textual record of Canaan is rich with animal related references, information that permits the exploration of extra-economic variables in zooarchaeology. Animals were pawns in a system of ethno-political identification which operated through animal pre- and pro-scriptions known from biblical and extra-biblical literature. The effect of these ideological laws is explored with data from Philistine and Israelite Iron Age sanctuary sites. Second, Canaan was the scene of endless conflict between the imperial superpowers and local states. The tension in the opposition between these forces is reflected in the patterns of pastoral production which emerged as external pressures waxed and waned.

Hester, James J. (*Colorado*)

[63] THE ROLE OF ARCHAEOLOGICAL SITE PRESERVATION IN CRM

Three years of research conducted by the U.S. Army Engineer Waterways Experiment Station has identified a number of techniques suitable for protecting and preserving archaeological sites in-situ. Full scale integration of these methods into Cultural Resource Management is yet to come; however, site preservation activities must be considered as management alternatives to mitigation or site avoidance. A prospectus for site preservation as a form of management will be developed.

Hester, Thomas R. (*Texas*) and Harry J. Shafer (*Texas A&M*)

[46] THE ANCIENT MAYA CRAFT COMMUNITY AT COLHA, BELIZE AND ITS EXTERNAL RELATIONSHIPS

The ancient Maya site of Colha, Belize, is noted for the many debitage deposits and lithic workshops indicating a community-wide craft specialization in the production of chipped stone tools. Lithic technology studies of collections from major sites in the region suggest that Colha was the major production center and supplier of utilitarian (and ritual/ceremonial) stone tools from Late Preclassic through Late Classic times. However, its community status changed in the Classic period. This paper examines the role and status of Colha as a Maya community in the region of northern Belize in the Late Preclassic and Classic periods.

Hodder, Ian (Cambridge)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Hodge, Mary (Houston-Clear Lake)

[25] AZTEC PRODUCTION AND EXCHANGE OF CERAMICS: ARCHAEOLOGICAL EVIDENCE AND ETHNOHISTORIC MODELS

A project reanalyzing Aztec period ceramic collections gathered by the Valley of Mexico Survey projects has mapped the spatial distribution of decorated ceramic types at sites in the Chalco, Xochimilco, Ixtapalapa, and Texcoco regions. Concentrations of specific ceramic types and decorative design elements are used to estimate the extent of production and distribution systems in the area examined. Models of Aztec economic organization derived from documentary accounts are assessed in view of this study's findings.

Hoffman, Christopher (UC-Berkeley)

[34] THE BEGINNINGS OF METALLURGY IN THE WESTERN MEDITERRANEAN

The distribution and development of chalcolithic metallurgical traditions, during the late third and early second millennia B.C., throughout the western Mediterranean is reviewed, with particular reference to the Balearic Islands. What are the social conditions that affect the introduction, adoption, assimilation or even invention of copper metallurgy? How do people respond to new technologies and new materials? An analysis of technological aspects of the production sequence and their location in a social landscape provides some answers to these questions.

Hoffman, Nancy Watford (George Washington)

[52] ISLAND ADAPTATION: THE IMPLICATIONS OF A SPANISH CERAMIC ASSEMBLAGE IN A LUCAYAN SITE

Island environments and adaptation may require a different approach to the interpretation of material culture, especially if the artifactual assemblage is exotic (foreign) in nature. An indigenous site on San Salvador Island, Bahamas is discussed where a large amount of exotic materials were excavated. In particular, the Spanish ceramic assemblage provides an opportunity to examine material culture in terms of its relationship to the processes involved in adapting to an island environment.

Hofman, Jack L. (Oklahoma Archeological Survey) and Lawrence C. Todd (Bowman)

[40] REINVESTIGATION OF THE LIPSCOMB BISON KILL AND ITS SIGNIFICANCE FOR FOLSOM PERIOD RESEARCH

The Lipscomb Bison Quarry was first investigated in 1939 by the Nebraska State Museum. Following Schultz's 1943 publication on that first season's work, Lipscomb has figured importantly in discussions of Paleoindian lifeways. This report summarizes research at the site during the 1989, 1944, and 1988 seasons and the results of a continuing study of extant collections. Consistent with published accounts, a MNI of 55 bison are represented at the kill in a 138 square meter area. The season of the kill, based on dentition, was early fall. Comparison of the site with other Folsom localities documents its extreme significance for Paleoindian research.

Holdaway, Simon (Pennsylvania)

[24] WERE THERE HAFTED PROJECTILE POINTS IN THE MOUSTERIAN?

A test is proposed to determine whether morphologically-defined points were used as hafted projectiles based on the pattern of use-related damage seen on projectile points from recent periods. The test is applied to Mousterian points, identified according to Barlet's typology, from two Iranian sites (Warwasi and Bisitun). The results show that the Mousterian points from these sites do not have a breakage pattern consistent with a projectile point function. The lack of hafted projectiles in the Mousterian has important implications for hominid behavior, particularly in light of the recent debates concerning the importance of hunting in early hominid adaptations.

Holdcraft, T. R. (see Kent, J. D.) [55]

Hole, Frank (Yale)

[59] PATTERNS OF ADAPTATION IN THE JEZIREH

The Jezireh of North Syria has hosted a mosaic of human adaptations which culminated in the third Millennium B.C. in large walled urban centers with far-flung economic and political ties. The foundations on which these were built lie in sites of the sixth through fourth millennia. Both indigenous developments in agriculture and herding and exogenous influences that drew local populations into much larger spheres of interaction and political complexity are seen in these sites. Based on data from excavations at Umm Qseir, Tell Aqab and others, as well as on sources, history and ethnography, the interactions between settled agriculturalists, herders, traders, and nomads are discussed.

Holley, G. R. (see Dalan, R.) [60]

Hollowell, J. Lee (Consultant)

[42] REASSESSMENT OF THE FORTALEZA, OLLANTAYTAMBO, PERU

The Fortaleza is a well-known site whose remarkable stonework has been attributed to the late Inca period. Careful analysis of the architecture and of the craftsmanship of stoneworking, however, reveals that it is a much more complex and enigmatic site than conventionally thought. Five distinct styles of architecture and craftsmanship can be recognized, suggesting five separate periods of construction/demolition. The present central feature, the Templo del Sol, is a reconstruction of elements dismantled from an earlier building. There is substantial evidence that it had been located in the valley below, where the Catholic church now stands. A number of the characteristics of the stonework are clearly related to those of Tihuanacu, Bolivia.

Hoopes, John W. and Geoffrey G. McCafferty (SUNY-Binghamton)

[62] OUT OF MEXICO: AN ARCHAEOLOGICAL EVALUATION OF THE MIGRATION LEGENDS OF GREATER NICOYA

Historic documents of Greater Nicoya record migration legends in which the inhabitants traced their ancestry to central Mexico. Ceramics from the later preconquest periods indicate a strong but poorly defined "Mesoamerican" influence. These legends are critically examined and their archaeological implications are reviewed. The material culture of the "Mixteca-Puebla" style is discussed, relevant regional chronologies of Mexico and Central America are reviewed, and the implications of migration legends are evaluated with special emphasis on the identification of ethnic groups in the archaeological record.

Hoskinson, Charles Tom (Bowers Museum)

[78] FOUR SUNS WIDE: CALENDRIC INVESTIGATIONS AT A TOHONO 'O'ODHAM SITE

The site is a "Fortified Hill" or "Trincheras" site located on the Tohono 'O'odham Reservation in Arizona. This site has many short, low, dry masonry walls which are concentric to the hill. Tohono 'O'odham consultants state that "things were grown there" and that "it was a place where ceremonies were held." Near the summit of the hill, there is an east facing wall and leaning against it, pointing east, is a large rectangular stone. One of the consultants believes that this stone marks the place one stands to watch the sun. This investigation explores that hypothesis.

Houston, Stephen (Vanderbilt)

[62] PASSIONS . . . STAMPED ON THESE LIFELESS THINGS: THE HISTORIOGRAPHY OF THE CLASSIC MAYA

The explosion of recent research on Mayan hieroglyphics throws much light on the Classic period (ca. A.D. 250-900). Yet, until now, there have been few explicit evaluations of the reliability and quality of such records *qua* historical documents. This paper assesses the sources of Classic Maya history and examines their usefulness for the study of Maya society.

Houston, S. (see Demarest, A.) [11]

Hsu, J. T. (see Richardson, III, J. B.) [28]

Huber, Edgar (Washington State)

[53] GREEN LIZARD SITE: EXCAVATIONS AT A LATE PUEBLO III SMALL HABITATION

An overview of two seasons of excavation at Green Lizard, a small, late Pueblo III habitation in southwestern Colorado is presented. Recovered information suggests intensive site utilization characterized by deep midden deposits, extensive room construction and expansion events, and remodeling in the kiva. Significantly, excavations have also revealed unanticipated constructional variability not normally associated with Pueblo III period sites in the area. The kiva was not masonry lined, surface rooms, in some cases, are three deep, and several trash-filled jacal structures, apparently dating to late Pueblo III, are present in the plaza adjacent to the kiva.

Hudson, Charles (Georgia), John Worth (Florida) and Chester DePratter (South Carolina Institute of Archaeology & Anthropology)

[1] REFINEMENTS IN DE SOTO'S ROUTE THROUGH GEORGIA AND SOUTH CAROLINA

Since the publication in 1984 of the reconstruction of Hernando de Soto's route from Apalachee to Chiaha by Hudson, Smith, and DePratter, several advances have been made in both documentary and archaeological research. In some instances these advances make possible a more precise reconstruction of this segment of the route, and in other instances they raise questions about our interpretation of the social geography which can only be answered through additional research.

Hudson, Jean (UC-Santa Barbara)

[47] IDENTIFYING NON-SELECTIVE, SMALL GAME HUNTING STRATEGIES IN THE ARCHAEOLOGICAL RECORD

To distinguish archaeologically between hunting, scavenging, and natural death assemblages, we must understand the formation of faunal assemblages associated with a wide variety of hunting techniques. Ethnoarchaeological data from a modern tropical forest foraging group, the Aka pygmies of the Central African Republic, are examined to identify processes which produce the faunal assemblages characteristic of non-selective, small game hunting. Faunal assemblages from a net-hunting camp and a trapping camp are compared. Most game species are small to medium in size, weighing between two and twenty-five kilograms. Analysis focuses on species size, age and patterning in the distribution of skeletal elements.

Hughes, Malcolm (Arizona)

[39] TREE RINGS AS RECORDS OF LARGE-SCALE ENVIRONMENTAL EVENTS

There is growing evidence that dendrochronologically dated tree-ring series may be used as temporally very precise records of some large-scale environmental events during approximately the last 8,000 years. For example, some explosive volcanic eruptions inject large enough quantities of certain materials into the upper atmosphere to produce marked climate changes on a hemispheric or perhaps global scale for a year or more. Such eruptions may be recorded variously in frost-damaged rings, low-density late wood and suppressed radial growth in regions as far apart as California, northern Canada, and Ireland. It has been suggested that the eruption of Santorini in the Eastern Mediterranean during the mid-17th century B.C. was recorded in this way. The basis for connecting tree-ring records to such climatic events will be explored as will the potential for their use in examining impacts on humans.

Hughes, Richard E. (California State-Sacramento)

[70] MOSAIC PATTERNING IN PREHISTORIC CALIFORNIA-GREAT BASIN EXCHANGE

Exchange relationships between California and the Great Basin can be documented for at least the last 5,000 years. While a considerable amount of new information has accrued over the past ten years on time-space distributions, comparatively little attention has been devoted to exploring "meaning"; that is, the ways these data monitor the social interactions and systems that produced the observed distributions. Obsidian and shell circulated in different ways in the western Great Basin, and this variability carries clear implications for static and dynamic reconstructions of prehistoric settlement and subsistence strategies throughout the Great Basin.

Humpf, Dorothy (Pennsylvania State)

[76] HEALTH, DEMOGRAPHY, AND STATUS IN THE SIXTEENTH-CENTURY COOSA CHIEFDOM

Spanish explorers described Coosa as one of the most powerful sixteenth-century chiefdoms in the southeastern United States. Ethnohistoric and archaeological data suggest that the capital of the Coosa province was the Little Egypt site in northwest Georgia. Preliminary results of an analysis of skeletal series from the Little Egypt mound site and two Lamar period non-mound villages (the King and Etowah sites) within the Coosa province are presented. The demographic structure, health and status differences within and between these sites is examined.

Hunt, C. O. (see Colten, R.) [34]

Hunt, Eleazer (SUNY-Buffalo)

[68] LATE WOODLAND SETTLEMENT PATTERNS OF WESTERN NEW YORK: AN EXPLANATORY MODEL

In 1988 a regional archaeological project was initiated in western New York. The hub of the research centered on the Ripley site, excavated by Arthur C. Parker in 1906. This Late Woodland site is an anomaly from the standpoint of both settlement location and subsistence remains. In light of this, the problem of modeling settlement patterns in western New York is addressed. One major emphasis is the development of horticulture and the implication this development has on settlement patterns. A multivariate model is proposed that suggests various settlement patterns, and ultimately leads to the explanation of an apparent anomalous situation.

Hunt, Terry and Michael W. Graves (Hawaii)

[74] SOME METHODOLOGICAL ISSUES OF EXCHANGE IN OCEANIC PREHISTORY

Explaining the role of exchange and interaction in the evolution of Oceanic societies will require the solution of two methodological problems. The first of these is the identification of commodities moved. Identification requires compositional characterization, in some cases permitting geologic sourcing. The

second problem is less amenable to a technical fix. It involves linking patterns of exchange (deduced from distributional data) with models for the origins of social complexity in island settings.

Hunt, T. (see Graves, M. W.) [74]

Hutchinson, Dale L. (Illinois)

[1] POSTCONTACT BIOCULTURAL CHANGE: MORTUARY SITE EVIDENCE

Discussions pertaining to the period of European exploration and colonization of the New World have often focused on changes in patterns of health and disease for Native American populations. The role of data derived from mortuary sites in answering questions of the biological consequences of European contact and at what level changes in health and disease can be detected in the archaeological record is examined. Tatham Mound, an early contact period site in northwest Florida, serves as a central point of discussion for these issues.

Hutchinson, D. L. (see Larsen, C.) [44]

Hyland, David, James M. Adovasio, J. M. Tersak and M. I. Siegel (Pittsburgh)

[39] A NEW TECHNIQUE FOR THE IDENTIFICATION OF RESIDUAL BLOOD ON ARTIFACTUAL MATERIALS

Recent advances in molecular biological techniques have enabled researchers to indentify the species of origin of blood residues found on archaeological materials. The enzyme immunoassay technique, developed by the Cultural Resource Management Program of the University of Pittsburgh, utilizes a nitrocellulose protein-binding membrane and affinity absorbed antibodies, and avoids many of the problems inherent in other types of assays. Samples eluted from an endscraper collected at the Shoop site (11,000 B.P.), central Pennsylvania, have been positively identified as belonging to the cervid family. Research on genus determination of this sample is discussed as well as new methods of protein recovery and antibody purification. The ramifications of the successful implementation of this technique are discussed in terms of Paleoindian artifact function and paleoeconomic, paleoenvironmental, and paleodietary reconstruction using a case study from the Shoop site in central Pennsylvania.

Hyland, J. (see Wake, T.) [35]

Iceland, Harry (Texas-San Antonio)

[69] LITHIC ARTIFACTS AT THE TEOTIHUACAN MERCHANTS' BARRIO

Obsidian and chert artifacts from the Teotihuacan Merchants' Barrio were analyzed to determine: 1) flaked stone tool manufacturing processes and 2) other economic activities taking place at the site; 3) the extent and nature of the foreign contacts of its inhabitants; and 4) evidence of internal and external differences in social status. Technological analysis indicates most tools were produced within one of four industries, in proportions atypical of Classic Teotihuacan, and small numbers appear to have been imported from as far as the Maya region. Hematite residues on working edges are suggestive of low-level craft specialization.

Ilett, Michael (Centre de Recherches Protohistoriques)

[9] FORAGER-FARMER INTERACTION IN THE NEOLITHIC OF NORTHERN FRANCE

The current evidence for interaction between foraging and agriculturalist groups in the Neolithic of northern France is outlined for the early fourth millennium B.C. The possible effects of this interaction on the subsequent development of agriculturalist groups in this region are discussed.

Irwin-Williams, Cynthia (Desert Research Institute)

[58] THE POSITION OF WOMEN IN AMERICAN ARCHAEOLOGY: 1930-1988

The place of women in American Archaeology from 1930-1988 is reviewed with a focus on the changes which have occurred in the training of professional and social roles and positions which women have held in the last half century. Also considered is the degree to which "equality" with male colleagues has been obtained at various periods and in various areas of professional activities. The contributions of several key figures will be profiled.

Irwin, Geoffrey (Auckland)

[74] COLONIZATION AND EXCHANGE FROM LAPITA TO THE KULA

A closer definition of the method of colonization of the remote islands of the Pacific allows a distinction to be made between items which accompanied the initial expansion and those associated with subsequent exchange between established settlements. Both of these situations contrast with the context and content of exchange systems which had developed by late prehistoric times in coastal Papua New Guinea.

Isaac, Barry L. (*Cincinnati*)

[64] DEFINING THE ECONOMY FOR THE STUDY OF EARLY PALEOINDIANS

Two concerns expressed by archaeologists to the editor of *Research in Economic Anthropology* are examined: 1) the differences between cultural ecology and economic anthropology, and 2) the scope of economic analysis. Economy is treated as the specific mechanisms and processes—production, consumption (use), distribution, exchange—of human ecological adaptation; economy is neither synonymous with nor restricted to food subsistence in primitive economies, any more than it is in our own case. The relevance of modern hunter-gatherers to the study of Paleoindian economies is assessed, especially with respect to optimal foraging models.

Iseminger, W. (*see Dalan, R.*) [60]

Ison, C. R. (*see Gremillion, K. J.*) [27]

Jackson, H. Edwin and Susan L. Scott (*Southern Mississippi*)

[36] MISSISSIPPIAN HOMESTEAD-VILLAGE SYMBIOSIS: FAUNAL EXPLOITATION IN THE TOMBIGBEE VALLEY

Faunal assemblages from the Lubbock Creek Archaeological Locality and the Yarborough Site (22CL814) in the Tombigbee River Valley are contrasted. Differences in the assemblages are suggested to reflect the interdependent economic relationship between small single family homesteads and larger Mississippian villages.

Jackson, Lawrence J. (*Southern Methodist*)

[19] CHESTNUTS IN THE FIRE: SEASONALITY AND SETTLEMENT INDICATORS FOR THE EARLY WOODLAND IN ONTARIO

Subsistence and seasonality data for the Early Woodland period in Ontario have relied on inferences drawn from meager field data. The increasing pace of site discovery and excavation is beginning to provide a strong data base for cultural and settlement pattern observations. While the dated concept of Carolinian/Canadian Biotic Provinces limits investigation into the reality of environmental conditions from 1,000-300 B.C., the application of archaeobotanical, macro- and micro-faunal, and radiocarbon analyses to small site features suggests that new inferences regarding Meadowood phase subsistence are possible. Detailed information is drawn from the Dawson Creek site in south-central Ontario.

Jackson, L. J. (*see Ellis, C. J.*) [64]

Jackson, Thomas L. (*Archaeological Research Facility, UC-Berkeley*)

[18] WOMEN'S PRODUCTION AS SOCIAL AND ECONOMIC FOCUS

The way in which women's innovations in technology related to subsistence resources procurement and processing were fundamental structuring elements in the social and economic organization of certain California Indian groups is explored. The innovation of permanent, fixed milled facilities (bedrock mortars) used exclusively by women for processing the acorn dietary staple emphasized the organization of intra- and inter-"site" space along gender lines. Aspects of this organization can be recreated archaeologically. Theoretical and methodological implications of this sort of "engendered" prehistory are discussed.

Jackson, T. L. (*see Love, M.*) [35]

Jackson, T. L. (*see Arroyo, B.*) [35]

Jameson, John (*US Army Corps of Engineers*)

[33] CO-MANAGEMENT OF VANDALIZED SITES: OPPORTUNITIES AND PROBLEMS

The Anthony Shoals site in Georgia is one among many that are co-managed among agencies. Co-management of public lands, and the sites on them, presents some very interesting challenges. These challenges, opportunities for site protection, and management problems are discussed.

Jefferies, Richard W. and Michael J. Shott (*Kentucky*)

[5] LATE WOODLAND ECONOMY AND SETTLEMENT IN THE MID-OHIO VALLEY: RECENT RESULTS FROM THE CHILDERS/WOODS PROJECT

A common argument holds that labor requirements of economic practices determine settlement patterns in small-scale agricultural societies. Specifically, extensive agriculture is linked to aggregated settlement and intensive agriculture to dispersed settlement. This reasoning is evaluated in the study of Childers and Woods of Late Woodland sites on the Ohio River in West Virginia. Economic practices are documented through detailed studies of faunal, botanical, lithic and ceramic assemblages. Particular attention is paid to changes in resource diversity associated with agricultural intensification. Settle-

ment patterns suggest that these sites represent successive stages of community aggregation and dispersal possibly linked to sociopolitical as well as economic trends.

Jefferson, N. D. (*see Riggs, B.*) [52]

Jelks, Edward B. (*Illinois State*)

[38] ETHICS, PROFESSIONALISM AND ARCHAEOLOGY

Standards of ethical behavior have been codified for practitioners of certain professions (e.g., law, medicine, engineering, the priesthood, and archaeology). This paper reviews existing ethical standards for archaeology, compares them to standards of other professions, evaluates their effectiveness, and identifies some ethical problem areas of particular moment to the archaeological community of the United States.

Jeske, Robert (*Indiana-Purdue-Ft. Wayne*)

[13] THE EFFECTS OF TIME AND ENERGY ON LITHIC TECHNOLOGY: AN UPPER MISSISSIPPIAN EXAMPLE

Upper Mississippian lithic technology is characterized by a lack of formal tool types. Triangular bifaces, *pièce esquillées*, and utilized flakes make up the majority of late prehistoric assemblages in the Upper Midwest. Time and energy stresses inherent in a marginal horticultural society did not allow for an energy-intensive lithic procurement and reduction strategy. An expedient, bipolar technology was utilized to reduce locally available, poor quality lithic resources. Data from several sites are used to examine the relationship between social organization and energy input into lithic technology.

Johnson, Gregory (*Hunter*)

[59] UMM QSEIR IN SYRIA AND LATE URUK IN GREATER MESOPOTAMIA

The late fourth millennium witnessed cultural development of unprecedented scale and complexity over much of greater Mesopotamia. This was a period of only a few generations in which we recognize the remarkable formal similarity in material culture from southwestern Iran to the upper Euphrates. Late Uruk is usually viewed as a period of expansion in which a polity or set of polities sought to control access to scarce and valuable materials in regions beyond resource-poor Mesopotamia. It is suggested that processes of collapse may better account for the available data from Umm Qseir and other sites of ostensible expansion.

Johnson, Ian R. (*NSW National Parks and Wildlife Service*) and Helen S. Clemens (*Sydney*)

[48] BEYOND REGISTRATION: MAKING SITE REGISTERS RELEVANT TO CRM

The NSW Aboriginal Sites Register contains over 30,000 site records, consultant's reports, maps and photographs. A microcomputer database with mapping and statistical capabilities permits rapid response to public and professional enquiries. We are now attempting to move beyond efficient registration to an expanded role in Cultural Resource Management, by generating new information and presenting information more effectively, using GIS and predictive techniques. The paper targets the problems of generating predictive models for an extended area and computer mapping of register data.

Johnson, Lucy Lewis (*Vassar*)

[50] PALEOSHORELINES AND PREHISTORIC SETTLEMENT ON SIMEONOF AND CHERNABURA ISLANDS, OUTER SHUMAGIN ISLANDS, ALASKA

Reconstruction of the paleoshorelines of Chernabura and Simeonof Islands using Winslow's methods allows the location of prehistoric sites on the islands to be better understood. The resources available to inhabitants of these islands were particularly rich and less sensitive to disruption than those of other islands in the Shumagin group. Therefore, they were rapidly re-inhabited following earthquakes, allowing a detailed picture of human response to changing shoreline and beach configurations to be constructed.

Jones, B. Calvin and Gary Shapiro (*Bureau of Archaeological Research, Florida Dept. of State*)

[44] NINE MISSION SITES IN APALACHEE

After the initial exploration of America, Spanish attempts to maintain control over native populations in the Southeast region of the present United States was achieved through the provincial mission system. Their efforts were, perhaps, most productive in Northwest Florida among the Apalachee, where eighteen or more Franciscan doctrines were established between 1633-1704. We are just beginning to examine the details of that system and its impact on a population of 10,000 souls. Archaeological data gleaned primarily from our research over the past twenty years indicates that mission implantation and architecture appears unique to the Apalachee cultural and environmental setting.

Jones, John G. (Texas A&M)

[49] THE EXTRACTION AND ANALYSIS OF CALCIUM OXALATE PHYTOLITHS FROM ARCHAEOLOGICAL SEDIMENTS AND COPROLITES

Archaeologists are now beginning to realize the value of phytolith research. Studies to date, however, have centered almost exclusively on silica or opal phytoliths. Research has demonstrated that calcium oxalate druse and raphide crystals, produced in many plants, are proving to be taxonomically identifiable and thereby useful to the archaeologist. Though studies have centered largely on the Cactaceae, Liliaceae and Amaryllidaceae families, subsequent research has shown that calcium oxalate crystals are present in a wide variety of plants. Frequently preserved in coprolites and dry cave sediments, these phytoliths can offer insights into the diet and lifestyles of prehistoric peoples.

Jones, Kevin T. (Evert Foundation) and David B. Madsen (Utah Division of State History)

[41] TRANSPORTATION COSTS AND DIET CHOICE IN THE GREAT BASIN

Food resources are often widely scattered in the Great Basin, and ethnographic accounts report great group mobility and transportation of collected foodstuffs. Experimental studies of Great Basin collected foods indicate that there is great variation between different resources in the food value that could be readily transported using aboriginal technology. The studies show that the food that could be gathered most efficiently is not necessarily the most likely candidate for transport. Hypotheses about which resources were most likely transported are tested against archaeological data on resource presence in sites and the location of probable acquisition.

Jordan, Richard H. (Alaska) [Discussant 50]

Joyce, Arthur (Rutgers), Raymond G. Mueller (Stockton State) and Marcus C. Winter (INAH)

[69] DRAINAGE BASIN DYNAMICS AND PREHISPANIC SOCIAL EVOLUTION IN THE LOWER RIO VERDE VALLEY, OAXACA, MEXICO

Archaeological and sedimentological research in the Lower Rio Verde Valley indicates that geomorphological changes in the Rio Verde drainage system dramatically effected prehispanic human populations. Late Formative population growth and agricultural intensification in the upper drainage basin resulted in increased erosion and runoff into the drainage system. This caused a rapid channel shift of the Lower Rio Verde as well as increased flooding and alluvial deposition on the floodplain. Settlement locations followed the changing position of the river and the greatly increased input of alluvial deposits on the floodplain raised agricultural productivity leading to population growth and increasing social stratification.

Judge, W. James and Elizabeth Bruen (Fort Burgwin Research Center)

[23] VISUAL AND VERBAL IMAGES OF LOOTING

This presentation employs photo images of looted and vandalized sites from all sections of the country to document graphically the nature and extent of the problem of purposeful destruction of archaeological sites in the United States. The narrative accompaniment is compiled from actual statements by looters, relic hunters, collectors, research archaeologists, law enforcement personnel, and land managers, all of whom are a part of the situation. The full impact of looting is presented visually, and an insight into its causes and effects, verbally.

Juell, K. E. (see Schmitt, D. N.) [43]

Julien, Daniel G. (Texas)

[42] LATE PRE-INCA POLITICAL GEOGRAPHY OF THE CAJAMARCA REGION, PERU

A model of late pre-Inca political geography of the region surrounding Cajamarca, in the North Highlands of Peru, can be formulated based on ethnohistoric data and archaeological research. This model can be projected back in time to help delineate the culture history of the region. Several chiefdoms emerged during the Late Intermediate Period, following a time of socio-political disintegration. By the Inca conquest, five of these had been integrated into a paramount chiefdom with its capital on the western Andean slopes. The data suggest that the Incas reorganized the region upon its incorporation into the empire.

Jull, A. J. (see Long, A.) [39]

Junker, Laura (Vanderbilt)

[74] TRADE AND SOCIAL COMPLEXITY IN THE PHILIPPINES

Recent archaeological research in the Philippines suggests that the initiation of intensified long-distance trade between coastal chiefdoms and the developed states of mainland Asia in the early second millennium A.D. effected a reorganization of internal trade networks to facilitate the movement of raw materials for both Philippine and Chinese "prestige good" production. These trade-fueled transforma-

tions, involving increasingly centralized control of raw material procurement, craft manufacture and distribution of status-symboling goods, are hypothesized to have social structural ramifications in increasing socio-political integration of ethnically distinct upland and lowland Filipino populations.

Kajafi, Zeidan (Yarmouk-Jordan), Alan Simmons (Desert Research Institute) and Gary Rollefson (San Diego State)

[81] WADI SHU'EIB, A MAJOR NEOLITHIC CENTER IN WESTERN JORDAN

Test excavations at Wadi Shu'eib in western Jordan during 1988 revealed it to be a large Neolithic center rivaling contemporary Jericho and 'Ain Ghazal. The site's strategic location between these two major settlements undoubtedly contributed to its importance. Although limited in scope, the 1988 excavations revealed over five meters of well-preserved aceramic and ceramic Neolithic deposits. Notable are several sub-floor burials and architecture standing over 1.5 meters. The significance of Wadi Shu'eib to regional Neolithic settlement patterns and adaptations are summarized in this paper.

Kaiser, Timothy (Toronto)

[80] PRODUCTION AS MEANING: POTTERY MAKING IN NEOLITHIC SOUTHEAST EUROPE

Technical studies of artifacts normally aim to reconstruct particular production sequences. Although such reconstructions have yielded insights regarding prehistoric economics and have provided the basis from which artifact function(s) can be inferred, they have been criticized as being "merely descriptive." This paper examines the technological styles of several ceramic production sequences in the Balkan Neolithic and reveals the presence of variably complex combinations of knowledge, labor, and resources. These combinations, as styles, are argued to reflect the social meaning attributed by producers and consumers to the pottery thus manufactured.

Kalogirou, Alexandra (Indiana)

[9] THE FOURTH MILLENNIUM IN THE AEGEAN

The fourth millennium in the Aegean, although crucial in our understanding of the subsequent Early Bronze Age, is still archaeologically underrepresented and poorly analyzed. Problems in chronology and terminology are discussed and the nature of the extant evidence is examined. The focus is on settlement patterns, subsistence economy, and burial practices in both local and regional scales. The data seem to point towards original diversity rather than uniformity. An attempt is made to present the underlying social structures and possible socio-economic transformations leading to the emergence of complex societies and the early urban centers of the Aegean.

Kann, Veronica M. (St. Lawrence)

[69] LATE CLASSIC POLITICS, CLOTH PRODUCTION AND WOMEN'S LABOR: AN INTERPRETATION OF FEMALE FIGURINES AT MATACAPAN, VERACRUZ

The transition from the Middle Classic to Late Classic period at Matacapan is marked by changes in the anthropomorphic figurine record, particularly with the development of fine orange, mold-made whistle and rattle figurines, a tradition which differs technologically, stylistically, and in subject matter from earlier traditions. Female figurines, rare at Matacapan during the Middle Classic, are reemphasized and substantially outnumber male figurines. Ethnohistoric and archaeological data are used to suggest that these figurines are not meant to represent reproduction, fertility, or specific goddesses, but rather the growing importance of cloth production for Late Classic Mesoamerican states. The appropriation of cloth production, traditionally a female activity in the domestic sphere, and its links to political centralization and interregional economic activity are discussed.

Kaplan, Lawrence, Mary B. Smith (Massachusetts) and Lesley Anne Sneddon (Nature Conservancy)

[49] CEREAL GRAIN PHYTOLITHS OF THE NEAR EAST

To provide a taxonomic survey and reference base for the Near East cereal grains and their relatives, an extensive collection for microscopic study has been prepared. We obtained viable "seed" for the cereals known to occur prehistorically in the region and grew these in the greenhouse or in controlled environment facilities. From the floral and vegetative plant parts we prepared spodograms and cell-free extracts of the biogenic opaline bodies for optical and scanning electron microscopy. Our methods and a distribution of phytolith types within the array of cereal grains is presented.

Kay, Marvin (Arkansas)

[30] PROSPECTS FOR ARCHAEOLOGICAL SEASONALITY ESTIMATES BASED ON MODERN ODOCOILEUS VIRGINIANUS CEMENTUM

Petrographic thin sections of mandibular first molars of Arkansas deer of known data of death and sex reveal characteristic cementum annuli. Their usefulness along with total cementum thickness as independent aging techniques essential to seasonality estimates is assessed by comparison with age estimates derived from mandibular tooth eruption and wear. Results indicate: 1) a probable early spring

period for cementum annulus formation; 2) likely resorption of annuli in deer older than 48-60 months; 3) varying degrees of imprecision in seasonality estimates using annuli or cementum thickness due to the unknown time of birth and species of midwestern archaeological deer.

Kealhofer, Lisa, J. R. Richards (Pennsylvania) and B. J. Baker (Massachusetts)

[55] MORTUARY RITUAL AND SPATIAL PATTERNING: THE NORTHERN CEMETERY, ABYDOS, EGYPT

Abydos, an important cemetery and town site during the pharaonic period in Egypt, is located in Upper Egypt, north of Luxor. Believed to be the burial place of the head of Osiris, Abydos was a major focus of mortuary ritual. Recent (January - June 1988) fieldwork in the Northern Cemetery at Abydos revealed major shifts in the spatial patterning of burials, reflecting changes in access to the cemetery throughout the Middle and New Kingdoms. These shifts are linked not only to alterations in religious ideology and mortuary ritual, but also to Abydos' changing politico-economic role in pharaonic Egypt.

Keegan, William F. (Florida Museum of Natural History)

[50] LUCAYAN SETTLEMENT PATTERNS AND RECENT COASTAL CHANGES IN THE BAHAMAS

The Bahama Islands are composed of marine sediments and wind transported sands that were sculpted by wind and sea during the Pleistocene. Following their creation atop the subsiding Bahama Platform these low-lying carbonate islands have been continuously reshaped by erosional and depositional processes. The only documented prehistoric occupation was by Lucayan Tainos (A.D. 700-1520), whose villages were located in coastal settings. Archaeological surveys have revealed that our knowledge of Lucayan settlement behavior is strongly influenced by the effects of those processes. Recent changes in coastal geomorphology with regard to Lucayan settlements are discussed.

Keel, Bennie C. (National Park Service) [Discussant 27]

Keel, Bennie C. (National Park Service) [Discussant 23]

Kelley, Jane H. (Calgary)

[58] BEING AND BECOMING

Accepting the premise that sociological aspects of science have an impact on its practice, it is argued that archaeologists would benefit from a clearer understanding of certain sociological matters. Recruitment into the discipline and survivorship in the professional ranks are discussed from a personal perspective. Variables involved in recruitment may apply to both men and women; problems of survivorship are particularly acute for women. The current lack of understanding of such variables results in each women's history appearing idiosyncratic; however, career patterns for women may show more commonality than is usually recognized.

Kellogg, Doug (Maine)

[68] PALEOENVIRONMENTAL RECONSTRUCTIONS AND THE FORMATION OF MAINE COASTAL SETTLEMENT PATTERNS

Geological and paleoecological studies have provided relevant environmental contexts for archaeological research along the central Maine coast. The challenge has been to integrate paleoenvironmental and archaeological data at the proper scales. Assuming that archaeological settlement patterns reflect human decision making, this paper considers information about the environment as a unifying concept for modeling the formation of settlement patterns within a changing landscape.

Kelly, John (Southern Illinois-Edwardsville)

[36] EMERGENT MISSISSIPPIAN COMMUNITY AND HOUSEHOLD ORGANIZATION IN THE AMERICAN BOTTOM

Emergent Mississippian represents a transitional unit during which certain subsistence and demographic changes occurred. These changes had to varying extents a major impact on the organization of society at both the household and community level. Hence many of the elements of Mississippian community organization were in place prior to its crystallization. Emergent Mississippian household and community organization is examined in light of its origins and its role in the ultimate development of Mississippian culture in the American Bottom region of the central Mississippi valley.

Kelly, Robert L. (School of American Research) [Discussant 41]

Kennedy, Mary (Washington) and Patty Jo Watson (Washington-St. Louis)

[18] THE DEVELOPMENT OF HORTICULTURE IN THE EASTERN WOODLANDS OF NORTH AMERICA: WOMEN'S ROLE

We combine the general anthropological notion of sexual division of labor among foraging peoples, the ethnographic evidence for plant cultivation in the Eastern Woodlands, and the archaeobotanical evidence for the origin of horticulture in that same region to suggest that women were responsible for this innovation. We contrast this formulation with other recent formulations that, although not directly concerned with the division of labor in subsistence activities, tend indirectly to deny or trivialize women's contribution.

Kenoyer, J. Mark (Wisconsin)

[10] HARAPPAN CRAFT SPECIALIZATION AND THE QUESTION OF URBAN SEGREGATION AND STRATIFICATION

Archaeological data from recent excavations at the urban site of Harappa, Pakistan are examined for understanding the relationships between occupational specialization, segregation and socio-economic stratification in the urban centers of the Indus Civilization. In the absence of ancient written documents, ethnoarchaeological models and archaeological data are used to differentiate externally imposed centralization and control of production from non-centralized, intra-community aggregation of specialized craft production. Although these structurally different processes may result in similar patterns of localization of craft indicators, other variables may provide clues for understanding the nature of administrative and socio-ritual organization of the Indus Civilization [2,500-1,800 B.C.].

Kent, Jonathan D. (Metropolitan State-Denver), T. Rose Holdcraft (Peabody Museum) and Makoto Kowta (California State-Chico)

[55] ASPECTS OF FIELD CONSERVATION AND ANALYSIS OF PERISHABLE REMAINS FROM A LATE NASCA CEMETERY IN SOUTH COASTAL PERU

Aridity of the coastal desert is usually perceived as the main reason for good preservation of perishable remains such as wooden artifacts, textiles, and even human flesh. Absence of significant rainfall is often emphasized. Nevertheless, ambient relative humidity, soil acidity, and airborne salts can immediately begin rapid deterioration of excavated remains. The problems that these and other factors can cause for field analyses are also significant. Approaches to identifying and dealing with these difficulties are discussed using excavated burial remains from a late Nasca cemetery in the Acari Valley as subjects of analytical and field conservation efforts.

Kent, Susan (Old Dominion)

[8] DEMOGRAPHY OF NEWLY SEDENTARY FORAGERS AND IMPLICATIONS FOR ARCHAEOLOGY

The population make up, morbidity, and mobility of newly sedentary foragers from the Kalahari Desert of Botswana provide insights relevant to archaeology when compared with more nomadic and more sedentary foraging groups who also inhabit the Kalahari. These primarily hunter-and-gathering groups possess different mobility strategies indicating a demographic and spatial diversity that is seldom recognized ethnographically or archaeologically. By identifying the variability currently present and developing models to account for it, we can begin to formulate testable models for past societies, particularly those involved in the shift from nomadism to sedentism.

Khanna, Gurcharan (UC-Berkeley)

[10] LITHIC PROCUREMENT AND MOBILITY IN THE MESOLITHIC OF RAJASTHAN

The site of Bagor in east Rajasthan is one of the few well-dated Mesolithic sites in South Asia. Recent research into its lithic industry has revealed a raw material composition indicating a long distance source. Despite the presence of local sources of good quality quartz and its use for many of the stone tools, a significant proportion of the lithics was made from chalcedony originating in geological deposits 100 kilometers away. Explanations are offered for this preference and the implications of such a mobility pattern for subsistence activities and cultural contact are examined.

Killion, Thomas W. (John Carter Brown Library)

[4] HOUSEHOLD DIFFERENTIATION AT MIDDLE CLASSIC MATACAPAN

The surface ceramic assemblage from Matacapan documents a large, internally differentiated urban center in the Tuxtla Mountains of southern Veracruz, Mexico during the Middle Classic Period (A.D. 500-700). More than 6,000 systematic surface collections are utilized to pinpoint an array of concentrated residential middens extending for approximately ten square kilometers along the Rio Grande de Catemaco. These data yield information on the size and spacing of residential units at the site during

the height of its development. Intra-assemblage variability suggests productive and socio-economic differentiation among the large number of households comprising Middle Classic Matacanan.

King, Eleanor (Pennsylvania) and Daniel Potter (Harvard/Texas-San Antonio)

[46] SMALL SITES IN PREHISTORIC MAYA SOCIOECONOMIC ORGANIZATION: A PERSPECTIVE FROM COLHA, BELIZE

Traditional approaches to prehistoric Maya socioeconomic organization implicitly rely on certain assumptions about the relative complexity of large and small sites. Large sites are expected to exhibit marked functional diversity, economic specialization, and social differentiation. This complexity is thought to have evolved from their early control over critical resources. Small sites, by contrast, are viewed as structurally more homogeneous, dependent on the large sites for specialized service and products. Recent data from the small site of Colha, Belize, challenge these assumptions. This paper discusses problems with the traditional view and suggests alternative perspectives on Maya socioeconomic organization and its development.

King, Thomas F. (Advisory Council on Historic Preservation)

[23] THE MAGNITUDE AND DIMENSIONS OF THE LOOTING PROBLEM

The looting of archaeological sites is international in scope and massive in its dimensions, fueled by an insatiable market for antiquities and complicated by schizophrenic attitudes toward the problem by both the public and the archaeological community. Law enforcement approaches to the problem are and will probably continue to be unavailing.

Kintigh, Keith W. (Arizona State) [Discussant 17]

Kirch, Patrick (UC-Berkeley)

[74] SPECIALIZATION AND EXCHANGE IN THE LAPITA CULTURAL COMPLEX OF OCEANIA (1,500-500 B.C.)

The Lapita Cultural Complex spans more than 4,500 kilometers across the southwestern Pacific, representing the colonization of this island world by Austronesian speakers. For several centuries following colonization, Lapita communities maintained long-distance exchange interaction over distances up to 2,500 kilometers. Drawing upon recently excavated artifact arrays from the Mussau Islands (Bismarck Archipelago), the Western Lapita exchange network is examined. Evidence for specialization in the production of shell exchange valuables is presented, as well as for the importation of exotic goods (ceramic, obsidian). The significance of these data for understanding the history of inter-island exchange in Melanesia is explored.

Klippel, W. E. (see Morey, D. F.) [43]

Knecht, Heidi (New York)

[51] DESIGN VARIABILITY IN AURIGNACIAN BONE AND ANTLER PROJECTILE TECHNOLOGIES

Analysis of Aurignacian bone and antler projectile points has revealed both inter-regional and intra-regional variation and similarity. Contemporary differences and chronological changes are discussed in terms of technological innovation. Contemporary patterning and continuities through time are viewed as technological design strategies with which the Paleolithic artisans addressed their raw materials. Site-specific as well as region-specific distinctions in projectile point form and design will be delineated.

Knight, Vernon James, Jr. (Alabama)

[52] MISSISSIPPIAN SOCIAL ORGANIZATION

Paul Kirchhoff argued that so-called egalitarian clan systems, such as those found throughout Eastern North America, represent an evolutionary blind alley, in contrast to systems based on lineage and descent which are preadapted to stratification. Yet, he overlooked the latent hierarchical structure of eastern ranked clan systems. On ethnohistorical grounds, I contend that Mississippian stratified society emerged on a base of ranked clan organization. Features of Timucuan aristocratic organization illustrate this thesis, key elements of which were first suggested by Josselin de Jong.

Knudsen, Gary (USFS-Ozark)

[27] THE MANY HATS OF A CULTURAL RESOURCE MANAGER: WHAT CULTURAL RESOURCE MANAGERS CAN LEARN FROM OTHER MANAGEMENT PROGRAMS

The involvement of a Cultural Resource Manager in other management areas within the Forest Service is traced. The interaction that is required to work out solutions to problems to the satisfaction of all programs is discussed. What cultural resource programs return to the public also is explored.

Kobayashi, Masashi (Arizona)

[31] USE-WEAR ANALYSIS OF COOKING POTS

The formation processes of ceramic use-wear, especially those of carbon deposits, are poorly understood. Ethnoarchaeological study of pot use among the Kalinga, Philippines, in which ceramic use-wear patterns can be correlated with actual pot-use, has a great potential to develop models of the formation processes of carbon deposits. The models concerning the relationship between carbon deposits on cooking pots and the "degree of intensity of use" are presented based on the Kalinga ethnoarchaeological project. Archaeological and ethnological cooking pots in the Southwest are examined from the viewpoint of "functional differentiation and specialization of ceramic assemblage" using these models.

Koetje, Todd A. (Tennessee)

[17] SPATIAL ANALYSIS AT LE FLAGEOLET II (DORDOGNE): A PRELIMINARY LOOK AT THREE DIMENSIONAL PATTERNING

Traditional methods of spatial analysis are generally applied to those sites which are amenable to deflation into two horizontal dimensions. Couche IX at the Magdalenian site of Le Flageolet II (Dordogne) is internally undifferentiated and some 60 centimeters thick. Preliminary study of spatial patterning in three dimensions supports the general utility of several established spatial analysis techniques when applied to three dimensional data. Results from K-means cluster based formation, and subsequent analysis using measures of homogeneity and correlation, suggest the potential of this approach for the recovery of sets of independently deposited materials from sites whose general depositional reconstruction may appear otherwise intractable.

Kohler, Timothy A. (Washington State)

[12] FIELD HOUSES AND THE TRAGEDY OF THE COMMONS IN THE NORTH AMERICAN SOUTHWEST

If resources are both open to use by all and finite, each user gains the full benefit of resource exploitation but shares the costs of any depletion due to overexploitation with the entire user group. One possible response to resource depletion in this situation is to limit resource access. Field houses in the Southwest are usually considered to be devices for minimizing travel distance to and from distant fields in situations of population aggregation. A partially alternative hypothesis—that field houses also function to lay claim to limiting resources—is examined using data from the Dolores Archaeological Project in southwestern Colorado.

Koike, Hiroko (Saitama)

[30] RECENT DEVELOPMENTS IN SEASONAL DATING TECHNIQUES IN JAPAN

Seasonal dating projects to reconstruct prehistoric resource exploitation in Japan have been used extensively to establish standards of age determination for Sika deer, wild boar, fur seal, harbor seal, sea urchin, and other molluscs. Further, Ohyi et al. related determinations of age, sex, and season of death of the Yezo brown bear to the Okhotsk culture's bear festival, and Ushizawa tried to establish a seasonal dating method using fish scales. Technical improvements to these applications are discussed as a basis for reconstructing exploitation activities.

Kojo, Yasushi (Arizona)

[53] AUTONOMOUS CERAMIC PRODUCTION IN THE NORTHERN SOUTHWEST

In response to the growing concern with regional integration and societal complexity, the issue of ceramic exchange came to the fore in recent archaeological research in the northern Southwest. A plethora of studies argue for the prevalence of ceramic exchange in various areas and time periods. Not all studies, however, solidly endorse the idea of ceramic importation. That autonomous pottery production and consumption was the norm is indicated for Tusayan White and Gray Wares in northeastern Arizona on the basis of independent lines of evidence.

Kolen, J. (see Roebroeks, W.) [24]

Kornbacher, Kim (British Columbia)

[7] A METHODOLOGICAL STRIDE IN SHELL MIDDEN ARCHAEOLOGY

The progress of Northwest Coast archaeology has been hindered by the lack of a well-defined, practical methodology for the stratigraphic excavation of shell middens. The adaptation of the Harris Matrix to the complex stratigraphy of midden sites is a first step in the development of such a method. A step-by-step description of matrix construction—in the field and in the laboratory—and an explicit discussion of the subsequent correlation and interpretation of depositional events, provide a valuable methodological framework for Northwest Coast and other shell midden archaeologists.

Kornfeld, Marcel, Dale L. Wedel, Todd Guenther and Charles A. Reher (Wyoming)
[54] WYOMING TERRITORIAL PENITENTIARY: CONFINED SPACE, INDUSTRIAL PRODUCTION AND BEHAVIORAL MODIFICATION

Post renaissance theories of crime, punishment and rehabilitation led to development of penitentiary systems in the late 18th and 19th centuries. Conflicting sociological theories resulted in variation in penitentiary systems. This variation has clear archaeological correlates, which are investigated with the remains of the United States Penitentiary at Laramie, Wyoming. Investigations of this facility yield indications of the spatial structure, industrial production, recreation and the context of behavioral modification within a system based on Pennsylvania and Albany penitentiary models. These data allow us to evaluate the adaptation of an established penitentiary system to frontier conditions, as well as enter the sociological debate about penitentiary reform.

Kowalewski, S. (see Feinman, G.) [29]

Kowta, M. (see Kent, J. D.) [55]

Kra, Renee (International Radiocarbon Data Base-Arizona)
[39] NEW WORLD QUATERNARY VERTEBRATE LOCALITIES: THE FIRST PILOT PROJECT OF THE INTERNATIONAL RADIOCARBON DATA BASE (IRDB)

The pilot project that is being launched by the American Division of the International Radiocarbon Data Base (IRDB) is New World Quaternary Vertebrate Localities. Geographic coverage is limited to the entire Western Hemisphere and the chronological focus is on dates older than 8,000 B.P. By investigating radiocarbon dates of these topical and temporal areas, we will be able to approach several interdisciplinary research problems such as Early Man in the New World, megafaunal extinctions, paleoenvironmental and global change. A task force of scholars in these fields are compiling data sets housed at the University of Arizona headquarters of the IRDB.

Kramer, Carol (Lehman College-CUNY) [Discussant 46]

Kreinbrink, Jeannine (WAPORA, Inc.)
[45] THE WOODWARD SITE: ONE PIECE OF A BIG PUZZLE IN SOUTHEAST PENNSYLVANIA

Archaeological investigations of corridor sites often encompass only a small segment of the actual site area. The validity of assessing site form and function will be addressed based on investigations at a narrow corridor site in southeast Pennsylvania. On a large ridge overlooking the Brandywine Creek, this pipeline corridor intersected the extreme eastern tip of a large multi-component site. While the major component of the owners' large collection was Bare Island projectile points and preforms, the excavations contained an earlier focus within the Late Archaic.

Kreisa, P. (see Edging, R.) [52]

Krigbaum, John (New York)
[19] SUBSISTENCE AND HEALTH IN AN EARLY WOODLAND SKELETAL POPULATION FROM VERMONT

Bioculturally, little is known about the prehistoric inhabitants of Vermont's Champlain Valley. Subsistence and health data were obtained from remains (n=45 individuals) recovered from the Early Woodland Boucher cemetery. Stable carbon and nitrogen isotope ratios were determined for nine Boucher adult skeletons; six other burials (late Archaic to Late Woodland) from the area were assessed for comparison. Dental pathologies were also scored. All results are consistent with a broad spectrum hunting, gathering and fishing economy. Nitrogen values suggest that access to marine foods such as anadromous fish may have varied by site location.

Kuhn, Steven (New Mexico)
[66] DIVERSITY WITHIN HOMOGENEITY: ALTERNATIVE PERSPECTIVES ON MOUSTERIAN ASSEMBLAGE VARIABILITY

The Pontinian Mousterian of west-central Italy is typologically monotonous from the perspective of traditional (Bordian) systematics, the result of universally low frequencies of denticulate tools. Significant inter-assemblage variation is present in: 1) techniques for producing flakes from cores; and 2) strategies for the transport, discard and renewal of retouched tools. Unlike most conventional typological indices, these technological variables also appear to manifest both dimensional temporal change and links to patterns of faunal exploitation and cave use. Framing all Mousterian research in terms of traditional typological units ignores or disguises aspects of technological data directly relevant to contemporary research issues.

Lafferty, III, Robert H. (Mid-Continental Research Associates) and Neal H. Lopinot (Southern Illinois-Edwardsville)

[36] MISSISSIPPIAN HOUSEHOLD ORGANIZATION AND SUBSISTENCE DURING THE MID-FOURTEENTH CENTURY, BUFFALO NATIONAL RIVER, ARKANSAS OZARKS

Archaeological excavation in 1986 at the Erbie campground situated along the Buffalo National River in the Arkansas Ozarks resulted in the identification of a Mississippian period house and associated features. This homestead dated to the mid-14th century, and consisted of a 8m x 6m individually set post structure and seven internal pits with excellent faunal and floral preservation. A wide range of cultivated (maize, beans, squash, chenopodium, sunflower, little barley) and wild (deer, fish, birds) species are represented suggesting year-round occupation. Spatial and functional analysis of the plowzone artifacts define three household activity areas: domestic, stoneworking, and sleeping.

Lambert, Joseph B. (Northwestern) [Discussant 57]

Lancaster, William (British Institute of Archaeology)
[72] TRIBAL FORMATIONS IN BEDOUIN ARABIA

The physical, economic and political environment of Arabia is essentially unpredictable. Bedouin ideology emphasizes individual and group autonomy and jural equality, successful responses to the above unpredictability. The resulting tribal formations reflect complex interactions between the practicalities of multi-resource pastoralism, the symbiotic relationships with other parts of the total Arabian society, and the demands of ideology. The dynamics of tribal formations may be seen as a function of the internal logic of Bedouin discourse and expresses itself in some interesting conceptualizations.

Landers, Jane (Florida)

[22] AFRICAN PRESENCE IN EARLY SPANISH COLONIZATION

Africans participated in the earliest Spanish efforts of exploration and colonization and were a significant element in the multi-ethnic culture of the sixteenth-century Caribbean and Southeast. Most were slaves upon whom the Spanish depended for labor and military support. Others became free through cimarronaje or by availing themselves of Spanish legal institutions. Despite Spanish efforts to maintain racial separation, African interaction with European and Native American peoples took many forms. Although certain broad patterns may be discerned, local circumstances shaped each inter-ethnic contact. The African experiences in the southeast and Caribbean are examined, with a particular focus on St. Augustine.

Lange, Frederick (Colorado Museum)

[75] THE BAY OF SALINAS—COASTAL CROSSROADS OF GREATER NICOYA

The Greater Nicoya Archaeological Subarea is divided into a northern sector (Pacific Nicaragua) and southern sector (Nicoya Peninsula, Costa Rica). The Bay of Salinas lies at the juncture of these two sectors. Recent studies of the distribution of jade, ceramic types and varieties, and obsidian (supported by neutron activation and x-ray diffraction data) shed new light on the Bay of Salinas region as part of Greater Nicoya, and of Greater Nicoya as a subarea on the southern periphery of Mesoamerica.

Langford, Jr., James B. (The Coosawattee Foundation)

[1] THE COOSAWATTEE PLATE: A CATHOLIC/AZTEC ARTIFACT FROM NORTHWEST GEORGIA

An artifact found at the Poarch Farm site (9G01) in northwest Georgia gives supporting evidence of the visit of the de Luna expedition to the area in 1560. The artifact, an engraved and enameled copper plate, was likely made by an Aztec Indian in central Mexico during the mid-sixteenth century. The scene incised on the plate depicts post-conquest Aztec characters in a European religious iconographic scene, probably the Annunciation to the Virgin or the appearance of the Woman of Revelation (of the Apocalypse). The plate personifies the cultural exchanges taking place in the sixteenth century Western Hemisphere.

Langford, Jr., J. B. (see Hally, D. J.) [1]

Laporte, Juan Pedro and Vilma Fialko (Dumbarton Oaks)

[11] SPECIFIC ARCHITECTURAL COMPLEXES AND TERRITORIAL DEFINITION IN THE CENTRAL MAYA LOWLANDS

The identification of the "Mundo Perdido" as Tikal's astronomical complex permitted the detection of the site's first ritual center, dating to the end of the Middle Preclassic (Tzuc phase). The later appearance of a similar complex at Uaxactun, dating to the beginning of the Chicanel horizon, has sociopolitical implications for the territorial definition of centers in the central Maya lowlands, as well

as for the drastic changes in political structure that occurred at the inception of the Late Classic. In a comparative presentation, and as proof of the political character of these complexes which celebrate the solar transit, we present new evidence of sites that mark their reduced territories by using such complexes during the Late Classic period in the southeast of Peten, Guatemala.

Lara-Pinto, Gloria (Instituto Hondureño de Antropología e Historia/Kentucky)

[62] **INDIGENOUS COMMUNICATION NETWORKS IN 16TH-CENTURY HONDURAS: THE ETHNOHISTORICAL EVIDENCE**

The well known natural corridor that traverses Honduras from the North Coast through the Comayagua Valley to the Pacific Ocean has been assumed to be a route of transport and exchange in prehistoric times. The existing early ethnohistorical evidence for this and other associated routes in Central and North Honduras will be presented in an attempt to clarify its implications for the regional cultural interaction at the time immediately prior to the Spanish conquest.

Larralde, Signa (New Mexico) and Phillip Shelley (Eastern New Mexico)

[12] **TCHAMAHIAS: THE MANUFACTURE, USE, DISCARD, AND SUBSEQUENT CURATION OF A PREHISTORIC IMPLEMENT**

Tchamahias, the most distinctive and beautiful of Southwestern lithic implements, are highly polished "hoes" made of silicified shales from the Four Corners area and dating to the Mesa Verdean occupation of the San Juan River drainage. Through archaeological survey, use-wear analysis, analysis of breakage patterns, and ethnographic research, we have been able to reconstruct the "life history" of tchamahias from quarrying, to final polishing and hafting, to use, refurbishing, use of debitage by-products, discard, and ultimate curation as ceremonial objects by modern Pueblo Indians. The regional distribution of tchamahias provides further information about their history and function.

Larsen, Clark (Northern Illinois), Margaret J. Schoeninger (Harvard), Katherine F. Russell (Kent State) and Dale L. Hutchinson (Illinois)

[44] **BEYOND DEMOGRAPHIC COLLAPSE: BIOLOGICAL ADAPTATION AND CHANGE IN NATIVE POPULATIONS OF LA FLORIDA**

Much of the research of the biological consequences of the arrival of Europeans in the New World has focused on the catastrophic effects of Old World pathogens and demographic collapse. Equally important to a broader understanding of the consequences of contact, however, are questions relating to how native populations responded and adapted to great social, dietary, and behavioral changes representing in some instances long periods of time. In this regard, diachronic changes in *La Florida* are examined through the study of anatomy, bone chemistry, demography, and markers of stress.

Larsen, Curtis (U.S. Geological Survey)

[72] **PALEOENVIRONMENTS AND SETTLEMENT IN PREHISTORIC SOUTHEASTERN ARABIA**

Settlement in eastern Arabia is very sensitive to changes of climate and, in coastal areas, of sea level. Ongoing geomorphological and archaeological fieldwork in the Ja'alan region of Oman reveals the local paleoenvironmental conditions of hunter-gatherer and of more recent agricultural and pastoralist communities, both in the interior and along the coast. These results are then viewed on the wider regional scale of southern Arabia as a whole.

Larson, Daniel O. (California State-Long Beach), Joel Michaelsen and Phillip L. Walker (UC-Santa Barbara)

[37] **CLIMATIC VARIABILITY: A COMPOUNDING FACTOR CAUSING CULTURE CHANGE AMONG PREHISTORIC COASTAL POPULATIONS**

The prehistory of coastal populations has attracted considerable attention since it often provides a context in which many complex hunter-gatherer sociopolitical forms evolved. This paper discusses the promise of an explanatory model which considers the effects of population growth and extreme shifts in environmental conditions to explain the tempo of culture change for California's prehistoric coastal populations. Recent dendroclimatic research coupled with paleoceanographic sea-temperature reconstructions provided an unprecedented opportunity to examine regional changes in marine and terrestrial environmental conditions. The preconditions of population growth and prior adaptive adjustments set the levels of risk sensitivity to extreme climatic events and controlled the tempo of culture change.

Laville, Henri (Institut du Quaternaire-Bordeaux)

[2] **RECENT DEVELOPMENTS IN THE STRATIGRAPHY AND PALEOENVIRONMENTAL CONTEXT OF MIDDLE PALEOLITHIC OCCUPATIONS IN THE CIRCUM-MEDITERRANEAN**

Recent observations during excavations in the caves of Carhuela (Andalomsie, Spain), Temnata (Bulgaria), Karsin (Turkey), Kebara (Israel) and the open-air sites of Kadar and Zobiste (Yugoslavia) have provided original data on the stratigraphy and paleoenvironmental context of the Middle Paleolithic and of the transition to the Upper Paleolithic in the area surrounding the Mediterranean.

Lavin, Lucianne (Archaeological Research Specialists)

[19] **IMMIGRATION AND INNOVATION: THE LATE ARCHAIC/WOODLAND INTERFACE IN SOUTHERN NEW ENGLAND AND SOUTHERN NEW YORK**

Traditional interpretations of the origins and relationships of Lamoka and other Narrow Point traditions in the Late Archaic of Northeastern North America, and the subsequent appearance of Early Woodland Adena-like burial complexes, have focused on the questions of what, when and where. Recent archaeological and paleoenvironmental studies allow us to reformulate and readdress questions and provide insight into cultural processes. Data from southern New England and New York are used to reevaluate traditional theories on Late Archaic and Woodland immigration and ceremonial innovation, and to generate explanatory models of why and how these cultural phenomena occurred.

Lawlor, Elizabeth J. (UC-Riverside)

[49] **TAPHONOMY OF PHYTOLITHS IN THE MOHAVE DESERT: A PRELIMINARY REPORT**

Phytolith analysis may provide previously unattainable archaeobotanical information about open desert sites. A prerequisite to interpreting phytoliths in terms of human behavior (e.g., windbreak construction or seed harvesting) is an understanding of phytolith taphonomy in such desert conditions as alkalinity, wind erosion, and possible abrasion by sand. This report gives preliminary results of phytolith extractions from Mohave Desert grasses and dicots, surface litter, and pinch samples taken in conjunction with ecological transects. Applications to an archaeological project underway will be discussed.

Lebo, Cathy J. (Indiana)

[12] **SETTLEMENT CONTINUITY AND ADAPTIVE RESILIENCE IN THE NORTHERN SOUTHWEST**

Critics of traditional time-space frameworks in southwestern prehistory argue that prior reconstructions obscure behavioral diversity. Efforts to demonstrate the variety and resilience of adaptive strategies require sufficiently fine-scaled methods that anticipate cultural heterogeneity. This study examines changes in median occupation span in a sample of excavated sites from Black Mesa, Arizona. Occupation span reflects multiple variables including structure life and replacement, length of agricultural fallow, seasonal mobility, and population aggregation and growth. Settlement data are analyzed using survival models to provide a measure of short-term cultural responsiveness to environmental and demographic change.

Leibsohn, Dana (UCLA)

[75] **GREATER NICOYA CERAMICS: ICONOGRAPHICS FOR ELITE INTERACTION**

Elite polychrome ceramics from Greater Nicoya represent one of the primary indicators of inter-regional contact in prehistoric lower Central America. Recent analysis of the content and distribution of iconography in Greater Nicoya ceramics from the Middle Polychrome Period (800-1350 A.D.) reveals important relationships among a variety of ceramics from Honduras, Nicaragua and Costa Rica. Furthermore, iconographic relationships among Middle Polychrome Greater Nicoya and Mayoid ceramics indicate that a diffusion of ideas occurred, but ideas did not simply filter from north to south. Rather, a pattern of iconographic filtration emerges with multiple cultural boundaries marking varying intensities of elite interaction. This paper focuses on the iconography of Greater Nicoya polychrome ceramics and explores the implications of iconographic relationships as indicators of inter-regional and intra-regional elite contact during the Middle Polychrome Period.

Lennstrom, Heidi A. (Minnesota)

[42] **CHANGING RESOURCE UTILIZATION IN LATE PREHISTORIC PERU: AN ANALYSIS FROM THREE PUNA SITES**

Recent excavations in the upland puna region of highland Peru focused on three late prehistoric sites. Based on ceramic evidence the sites are assigned to the Late Intermediate Period (pre-Inca) and the Late Horizon (Inca). Analysis of botanical remains indicates a shift between the two time periods, showing an apparent increase in domesticates, and an increasing differential distribution of plant remains across

the sites. Both trends may be linked to Inca domination of the area, and will be compared to trends in contemporary sites in the lower Quechua zone.

Lensink, Stephan (Iowa)

[32] RESOURCE DEPLETION AND INTER-SOCIETAL CONFLICT IN THE INITIAL VARIANT OF THE MIDDLE MISSOURI TRADITION

Explanations of cultural changes in Mill Creek culture, the best known Initial Variant manifestation of the Middle Missouri Tradition, have relied in the past on climatic shifts, particularly around A.D. 1200. It is argued that an episodic climatic event cannot account for the observed transitions in large ungulate procurement strategies. An alternate model based on central-placed foraging theory is proposed which incorporates resource depletion and the cost-reducing strategy of distant game hunting. Terminal occupation of the Mill Creek area in Iowa is viewed in the context of conflict with more mobile Oneota groups competing for bison resources.

Leone, Mark P. (Maryland)

[70] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Inherent in Marxist theory is a conflict between a plan for a science of society, with its well-known hope for a socialist future, and the understanding that capitalist societies construct views of the past according to class interests. My own position is as a materialist who has come in the last eight years to historical archaeology. I argue that a historical archaeologist who is a scientist must see the conditions that create questions and knowledge in order to know what questions and data an excavation can address and recover.

Levendosky, Alytia A. (Harvard), Judith A. Habicht-Mauche (School of American Research) and Margaret J. Schoeninger (Harvard)

[32] TESTING MODELS OF ANTELOPE CREEK PHASE SUBSISTENCE USING BONE CHEMISTRY ANALYSIS

Antelope Creek subsistence has been interpreted as consisting of a broad mixture of horticulture, hunting and gathering. Stable isotope analysis of skeletal samples, however, suggest that as much as 80 percent of these people's diet consisted of domesticated corn. Regional variation in trace element concentrations indicate that foraging was done in the immediate vicinity of each settlement. Ecological models suggest that it would have been difficult to produce consistently high corn yields given shortages of arable land and climatic variability in the area. Trade with the Southwest may have intensified to alleviate these shortfalls.

Leventhal, Richard M. and Peter S. Dunham (SUNY-Albany)

[11] A REGIONAL MODEL OF POLITICAL ORGANIZATION IN THE MAYA LOWLANDS: AN EXAMPLE FROM SOUTHERN BELIZE

A dynamic regional model within the Maya lowlands provides a starting point for the interpretation of the political organization during the Classic period. The Maya lowlands was not a cohesive unit but was composed of numerous, constantly changing regions. The variation throughout the Maya lowlands of the iconography, ceramics, settlement patterns and other material culture is due to the merging of an early regional indigenous culture with the elite facade we call Maya culture. This spread of Maya elite symbols out of the central Peten begins at approximately 8.18.0.0.0 and continues for more than 100 years. The development of a regional tradition will specifically be demonstrated with data from recent work in southern Belize.

Levine, Mary Ann (Massachusetts)

[58] WOMEN IN AMERICANIST ARCHAEOLOGY: THE FIRST GENERATION (1920-1960)

To date, histories of archaeology have been androcentric and truncated. In an attempt to complement current histories of archaeology, I will trace the history of women in Americanist archaeology for the period from 1920 to 1960. Research indicates that at least 21 women pursued a career in archaeology. To render visible their participation and discover patterns in their educational and professional backgrounds, I provide a biographical profile for many of these female pioneers. Greater attention must be paid to historical issues concerning women in archaeology if we are to move towards a complete understanding of the history of Americanist archaeology.

Levy, Janet E. (North Carolina-Charlotte), J. Alan May (Schiele Museum of Natural History) and David G. Moore (Office of the State Archaeologist-North Carolina)

[1] FROM YSA TO JOARA: CULTURAL DIVERSITY IN THE 15TH AND 16TH CENTURY CATAWBA VALLEY

Excavations at several late prehistoric sites in the Catawba Valley, North Carolina, provide information about the native societies met by the De Soto and Pardo expeditions as they penetrated

the interior southeastern United States. These sites may represent communities in the large chiefdom of Cofitachequi, but they contain diverse material assemblages, suggesting diversity in the native cultures. This diversity would require flexible Spanish responses. Although archaeological evidence of Spanish contact is currently limited, the investigation of these sites contributes to our understanding of the local native societies which have previously only been known through the Spanish chronicles.

Lewarch, Dennis E. (Evans-Hamilton, Inc.), Cheryl A. Mack (USFS-Gifford Pinchot) and James R. Benson (Evans-Hamilton, Inc.)

[70] LONG-TERM LAND USE PATTERNS IN THE SOUTHERN WASHINGTON CASCADE RANGE

Data from recent CRM projects in the Southern Cascade Range of Washington document long-term land use beginning about 7,000 B.P. Radiocarbon and tephra studies demonstrate the utility of cross-dating using projectile point styles from the Columbia Plateau and Lower Columbia River Valley. Survey and excavation projects provide initial information for the region on lithic technology, tool assemblages, role of local and exotic lithic material, range of settlement types, and site location. Patterns in the extant data set are reviewed and variability through time is assessed in terms of changing subsistence-settlement organization and possible analytical biases.

Lightfoot, Kent (UC-Berkeley)

[37] ARCHAEOLOGY IN THE HINTERLAND OF FORT ROSS, CALIFORNIA

A study of coastal hunter-gatherers is being undertaken in the hinterland of Fort Ross, an early 19th century Russian garrison and trade center in the North Coast Ranges of California. The purpose of the fieldwork is twofold. One is to delineate prehistoric subsistence-settlement patterns. The other is to evaluate the overall impact the Russian/Aleut community had on indigenous Pomo people. Preliminary results of the project are presented.

Lindauer, Owen (Arizona State)

[14] UNDERSTANDING STYLISTIC DIVERSITY OF PAINTED CERAMIC DESIGNS: AN INVESTIGATION OF HOHOKAM RED-ON-BUFF VESSELS

Stylistic variation can result from choices made by the potter relating to constraints of a vessel's size and shape as well as the manner in which designs fit and cover space. Design diversity analysis is conducted on a set of prehistoric Hohokam red-on-buff vessels having differing functions, design fields, and inferred levels of public visibility. Motif, element, and layout styles are compared with expectations for characteristics of diversity expected for stylistic information exchange as well as variability that is a product of production choices made by the potter. Suggestions are offered regarding evidence that identifies the various factors affecting stylistic variation.

Lindly, J. (see Clark, G. A.) [24]

Lipe, William (Washington State), Bruce Bradley, Mark Varien (Crow Canyon Archaeological Center) and Michael Adler (Michigan)

[12] THIRTEENTH CENTURY ANASAZI COMMUNITY ORGANIZATION IN SOUTHWESTERN COLORADO: THE SAND CANYON ARCHAEOLOGICAL PROJECT

The scale and complexity of prehistoric Southwestern Pueblo societies is a topic of considerable debate. The Sand Canyon Project is investigating thirteenth century Pueblo organization at the community and locality levels. Fieldwork has included excavation of approximately eight percent of Sand Canyon Pueblo (a site of roughly 400 rooms, kivas, and towers), testing of five nearby hamlets, and survey of about 30 square kilometers. Preliminary assessment is made of 1) internal chronology and differentiation at Sand Canyon Pueblo, 2) relationships between this large site and the small ones nearby, and 3) locality population and settlement pattern.

Little, B. J. (see Shackel, P.) [54]

Little, E. A. (see Medaglia, C.) [67]

Little, K. J. (see Curren, C.) [1]

Long, Austin (Arizona), B. F. Benz (Guadalajara), D. J. Donahue and A. J. Jull (Arizona)

[39] FIRST DIRECT AMS DATES ON EARLY MAIZE FROM TEHUACAN, MEXICO

The Tehuacan region in Central Mexico is thought to be the locale of origin of *Zea mays*, or maize, a cultivated plant pivotal in the development of agriculture in the Americas. The age of the earliest maize and its rate of dispersal are thus important component parts of cultural development in the New World. We have secured permission from the Federal Government of Mexico to date critical specimens from Tehuacan, which represent what are probably some of the earliest known stages of maize's

evolution. Twelve *Zea mays* samples have been dated, six from Cueva Marcos and six from Cueva Coxcatlan. These were selected as having the best stratigraphic control and correlation with previously dated charcoal samples, and to represent the most ancient maize. Corn from Cueva San Marcos is oldest: four of the six specimens from this cave were within statistics of 4,700 B.P. (uncalibrated). The oldest domesticated corn is thus no older than 3,600 B.C. dendro-calibrated in calendric years.

Longacre, William A. (Arizona)

[31] LONGITUDINAL ETHNOARCHAEOLOGY: THE KALINGA PROJECT OVER 15 YEARS

Ethnoarchaeological fieldwork was initiated among the Kalinga, a "tribal" society of the mountains of northern Luzon, Philippines, in 1973. Periodically since then, additional fieldwork focused upon pottery was carried out. During 1987-88 a major ethnoarchaeological project was completed greatly broadening the data base to include other realms of material culture in addition to pottery. This paper examines the special kinds of perspectives that 15 years provides for the planning of such research and its implementation. This is illustrated by the following of a population of more than 2,000 pots in use over those 15 years.

Lopinot, N. H. (see Woods, W. I.) [60]

Lopinot, N. H. (see De Mott, C. A.) [76]

Lopinot, N. H. (see Lafferty, III, R. H.) [36]

Loring, Stephen (South Carolina)

[19] AN EARLY WOODLAND CACHE FROM LABRADOR: PERCEPTIONS ON RITUAL AND CEREMONY IN THE "FAR NORTHEAST"

Recent work in Quebec and the Maritimes have significantly altered our perceptions of the diffusion of Early Woodland ceremonial activities. Mortuary ritual, including mound construction and elaborate burial practices associated with exotic artifact classes, demonstrates the pervasive nature of certain aspects of hunter-gatherer social dynamics throughout the "Far Northeast." An isolated cache of stone tools discovered at Daniel's Rattle on the central Labrador coast is attributed to an Early Woodland manifestation. The remarkable similarities between the materials recovered from Daniel's Rattle with those from other Early Woodland mortuary contexts are discussed within a framework of the social strategies that would facilitate the flow of information among dispersed populations of hunter-gatherers.

Love, Michael (UC-Berkeley) and Thomas L. Jackson (Archaeological Research Facility, UC-Berkeley)

[35] MIDDLE FORMATIVE EXCHANGE IN PACIFIC GUATEMALA: SOURCES OF OBSIDIAN FROM LA BLANCA

The lithic assemblage of La Blanca includes the earliest prismatic blades known from the Pacific coast of Guatemala. These blades were not made at the site, but were imported already formed. Nearly all of these blades can be attributed to one of three sources: El Chayal, Inxtepeque, and San Martin Jilotepeque, but the relative percentages of material from these three sources changes significantly during the course of the Middle Formative, and contrast sharply with the percentages for other classes of obsidian tools manufactured at the site. This suggests that Formative obsidian trade consisted of multiple exchange networks rather than being a monolithic system.

Lovell, W. G. (see Lutz, C. H.) [62]

Lovis, William A. (Michigan State)

[19] VARIATION IN LATE ARCHAIC RESOURCE AVAILABILITY AS A CONSEQUENCE OF LAKE LEVEL PERIODICITY IN THE HURON BASIN

Subsistence settlement models for the Saginaw Valley Late Archaic have traditionally employed a premise of stable lake elevation. Recent archaeological and geoarchaeological data reveal this premise to be untenable. A preliminary model assessing the effects of lake level fluctuation on the Late Archaic resource base is presented, with particular emphasis on the abundance and predictability of aquatic resources. Standing interpretations of the Late Archaic adaptation in this region are assessed relative to this preliminary model.

Lowell, T. (see Bourque, B. J.) [77]

Lupo, Karen D. (Utah)

[43] A COMPARATIVE ANALYSIS OF CARNIVORE BONE MODIFICATION

Recent taphonomic studies have demonstrated that carnivores can produce distinctive patterns of bone modification. The presence or absence of these patterns can aid archaeologists in determining the

origin of a faunal assemblage and the extent of carnivore modification. Faunal assemblages produced by mountain lions and coyotes are discussed. The assemblages differ dramatically in the degree of modification and some expected patterns of bone modification are absent. These differences are related to the foraging behavior of the two carnivores.

Lurie, Rochelle (Northwestern)

[60] ROBINSON RESERVE: A LONGFORD TRADITION HABITATION AND MOUND SITE ON THE DES PLAINES RIVER IN CHICAGO, ILLINOIS

Three seasons of excavation at the single component Langford Tradition Robinson Reserve site have produced a wealth of materials which elucidate the basic technological and subsistence activities of this Upper Mississippian cultural variant. Data from the analysis of lithic tools (primarily points and drills), debitage (indicating bipolar manufacture), sherds (representing the entire range of Langford forms), and a wide range of plants and animal remains (including corn, nuts, little barley, deer, and fish) are used for comparisons with other recently excavated Landford components in the Chicago area to establish Robinson Reserve's function within a regional settlement pattern.

Lutz, Christopher H. (CIRMA) and W. George Lovell (Queen's)

[62] THE MAYA OF GUATEMALA UNDER SPANISH RULE: REGIONAL VARIATIONS IN THE NATURE OF COLONIAL EXPERIENCE

Extending MacLeod's distinction between a Ladino "east" and an Indian "west" in colonial Guatemala, a resource-rich core and a poorly endowed periphery are defined. The differences between these zones affected land tenure and settlement, labor, production and exchange, economic institutions, and the conditions of social life. This paper explores the utility of the core-periphery dichotomy for a better understanding of the social history of Guatemala.

Lyman, R. Lee (Missouri)

[47] SUBSISTENCE CHANGE AND PINNIPED HUNTING

Oregon coast mammalian faunas spanning the last 3,000 years suggest a shift towards a logistical strategy of resource procurement. One fauna, however, indicates a shift from terrestrial to marine mammals. Mortality data and pinniped behavioral data indicate culling of particular age-sex classes, and imply one pinniped taxa was overhunted via exploitation of newborns of both sexes, thereby prompting the shift from marine to terrestrial taxa. Survival of the exploited population of the other pinniped taxon was not impacted at the other site because adult breeding males were the most intensely exploited age-sex class.

Lyman, R. Lee (Missouri) [Discussant 30]

Lynott, Mark J. (National Park Service) and James E. Price (Missouri)

[52] THE LATE WOODLAND TO MISSISSIPPIAN TRANSITION IN THE EASTERN OZARK REGION, SOUTHEAST MISSOURI

Shell tempered ceramics and arrow points appeared over a large area of the eastern Ozarks about A.D. 600, but resulted in negligible changes in the human adaptive strategies. During the Emergent Mississippi substage there is evidence for the appearance of maize, rectangular wall trench houses, and possibly flat top mounds. Despite the appearance of these Mississippian cultural elements, eastern Ozark groups maintained a high degree of autonomy. Settlement and subsistence practices continued to follow strategies which had been well established for several thousand years. Archaeological evidence from the Upper Current River drainage indicates the eastern Ozark region was abandoned by indigenous populations about A.D. 1300.

Lyon, Eugene (St. Augustine Foundation, Center for Historic Research)

[22] THE ENTERPRISE OF FLORIDA

The complex of interacting persons, groups and institutions in the Spanish Florida conquest of 1565-1577, the period of the proprietorship of Pedro Menéndez de Aviles and his successors, is described. The several means of interaction between the native Americans and the intruding Europeans are examined and an attempt is made to evaluate the degree to which actual contact events matched or departed from the rhetoric of "peaceful and Christian" conquest. Reasons for the failure of the Spanish settlement attempts under Menendez and his successors are investigated.

Mack, C. A. (see Lewarch, D. E.) [70]

MacKinnon, J. Jefferson and Emily M. May (Wisconsin)

[25] SMALL-SCALE MAYA LIMEMAKING IN BELIZE: ANCIENT AND MODERN

Results of excavations at an Early Classic Maya coastal site are reported. The hypothesized process by which shellfish gathered in the shallow lagoon were converted to lime was tested by a replicative

experiment. Modern small-scale production methods used by creoles, Garifuna, and Maya in Belize are compared. Excavations at a modern Maya limeworks suggest how the archaeological record at the ancient site was produced. The amount of edible meat by-product of the ancient process was measured. Recovery of obsidian and non-local basal-flanged polychrome suggests connections with coastal trade. Utilitarian pottery suggests connections with the inland site of C'habcen K'ax and nearby cays.

MacKinnon, J. J. (see Pohl, M.) [26]

Madry, Scott (ITD Space Remote Sensing Center)

[39] REMOTE SENSING IN ARCHAEOLOGY: A REGIONAL APPROACH TO NON-DESTRUCTIVE ANALYSIS

The use of non-destructive analysis in archaeometry is generally considered within the context of the material analysis of individual objects. The technologies of remote sensing, which include aerial photography, photogrammetry, ground-penetrating radar, sonar, satellite and air-borne multi-spectral scanners, image processing, and the new integrative capabilities of geographic information systems (GIS), provide archaeologists with powerful tools to analyze data in new ways. These methods can provide non-destructive, quantitative analysis and modeling at site-specific or regional scales. A general discussion is given of the current capabilities and applications of remote sensing in archaeology.

Madsen, David B. (Utah Division of State History)

[41] TRANSPORTATION, SEASONALITY AND STORAGE AMONG MID-LATITUDE HUNTER-GATHERERS

In mid-latitudes, wintering locations are structured by a play-off between transportation costs, availability of winter resources, and the amount of and accessibility to stored summer/fall resources, making it inappropriate to explain resource utilization by simple efficiency rankings alone. Examples from the Great Basin suggest that due to high transportation costs, wintering sites may often be structured by proximity to comparatively low-ranked winter-available resources rather than to high-ranked but often insufficient summer/fall-available resources. Variability in this play-off is ultimately responsible for the flexibility which characterizes many mid-latitude hunter-gatherer adaptive systems.

Madsen, D. B. (see Jones, K. T.) [41]

Madsen, Mark (Wisconsin) and Robert C. Dunnell (Washington)

[52] ROLE OF MICROARTIFACTS IN DEDUCING LAND USE FROM LOW DENSITY RECORDS IN PLOWED SURFACES

Surface collection is usually the only means of obtaining land use data for large areas. Tilled surfaces present special interpretive problems because they display only a small fraction of the plowzone artifact population for examination. Where land use and formation processes combine to produce a low density record, this sampling element can cause dissimilar records to appear identical when only macroartifacts (>2mm) are considered. Microartifacts (<2mm) because they have different transport properties and are typically more abundant offer a solution for such equifinalities. Data from the Middle Woodland of Southeast Missouri are used to demonstrate the potential of this approach.

Magness-Gardiner, Bonnie (Bryn Mawr)

[46] URBAN-RURAL RELATIONS IN THE SECOND MILLENNIUM B.C. LEVANT: THE TEXTUAL EVIDENCE

Although much of the research on early civilizations in the ancient Near East has focused on large urban centers and neglected small rural sites, such research has had the beneficial result of providing us with records of urban relations with their hinterland villages. These include census records which inform us of the range of population and social composition of villages as well as records of taxation and land transfers. By examining these records at the urban palaces of Alalakh and Ugarit, we can reconstruct to some degree the amount of control exerted by urban centers over the allocation of land in surrounding villages and the nature and amount of craft and agricultural products mobilized for the state from rural villages. Such information is important not only for reconstructing the political economy of the state but also provides a model which may be useful in interpreting archaeological material in areas where no texts are available.

Mahieu, E. (see Villa, P.) [66]

Majors, R. L. (see Marrinan, R. A.) [1]

Malpass, Michael (William and Mary)

[42] IRRIGATED VERSUS NON-IRRIGATED TERRACES IN THE ANDES: EVIDENCE FOR LATE PREHISTORIC CLIMATIC CHANGE

Both irrigated and non-irrigated terraces are present in the Andes, sometimes in vertical juxtaposition. In some areas, like the Colca Valley of southern Peru, the non-irrigated terraces, which are abandoned, are found in zones where dry farming is today impossible. This suggests that a change in rainfall or temperature regimes over time may be responsible for the abandonment of these terraces. Recent cultural and environmental evidence for climatic change in the southern Andes is explored over the past 1,500 years, and the impact it may have had on indigenous agricultural systems.

Malville, J. McKim, Frank W. Eddy (Colorado) and Carol Ambruster (Villanova)

[78] ASTRONOMY AT CHIMNEY ROCK, SOUTHWESTERN COLORADO

Two sites near Chimney Rock may have served as observing locations for sunrise and moonrise between the double spires. At the time of great northern standstill the moon rises between the chimneys as seen from Chaco style, Chimney Rock Pueblo. Based upon tree ring dates, Eddy identifies the two episodes of construction to have been A.D. 1076 and A.D. 1093. The great northern standstills were A.D. 1075.9 and A.D. 1094.5. Knowledge of the 18.6 year lunar cycle is suggested by the spiral of Fajada Butte. The great house above Peterson Gulch provides a location for observing equinox sunrise.

Manzanilla, Linda (Instituto de Investigaciones Antropológicas) [Discussant 4]

Marean, Curtis (UC-Berkeley)

[81] SABERTOOTH CATS AND THEIR RELEVANCE FOR EARLY HOMINID DIET AND EVOLUTION

In Plio-Pleistocene Africa three large sabertooth cat species were sympatric with early hominids and the ancestors of the modern felid community. An understanding of early hominid scavenging must articulate knowledge of sabertooth paleoecology with actualistic research. Sabertooth functional morphology and fossil associations suggest: 1) extreme flesh specialization and no bone-crushing ability, 2) specialization on very large prey, 3) a dense woodland and forest habitat preference. This suggests the presence of a closed habitat carnivore community dominated by sabertooths and an open habitat community composed of the modern felid ancestors. Scavenging opportunities were optimal in these closed habitats, and the sabertooth extinctions at 1.6 million years would have forced hominids into a confrontational and risky open habitat scavenging strategy.

Marks, Anthony (Southern Methodist)

[2] TYPOLOGICAL VARIABILITY IN THE EARLY LEVANTINE MOUSTERIAN: ITS NATURE AND SIGNIFICANCE

The Early Levantine Mousterian has been defined traditionally essentially by stratigraphy and technology. With new data suggesting a very long duration for this industry (less than 120,000 years to as late as 45,000), the stratigraphic definition is no longer viable. Its characteristic technology is well defined but little attention has been paid to its typology on a regional basis. This paper considers the range of typological variability present, as it relates to resource variability, basic technology, and chronology. In addition, the question of Middle Paleolithic versus Upper Paleolithic tool types are considered in placing this industry within the broader context of the Levantine Middle Paleolithic and the Mousterian in general.

Marrinan, Rochelle A. (Florida State), John F. Scarry (Florida Bureau of Archaeological Research) and Rhonda L. Majors (Florida State and USFS)

[1] PRELUDE TO DE SOTO: THE PANFILO DE NARVAEZ EXPEDITION

Eleven years before Hernando de Soto, the Narvaez expedition disembarked near Tampa, Florida. Between 1528 and 1535 members of this company traveled through Florida and the Gulf States. Despite its failure, the expedition had important consequences for native peoples and subsequent Spanish explorers. The composition, organization, and strategies of this Spanish expedition are examined and, where recorded, the responses of the Native Americans they encountered. Accounts of the expedition by its four survivors provide glimpses of the early postcontact lifeways of native peoples in the coastal areas of Florida, Alabama, Louisiana, and Texas.

Martin, Patrick E., Susan R. Martin and Lawrence L. Sutter (Michigan Technological)

[76] PIECING TOGETHER COPPERWORKING TECHNOLOGY: ACCRETIONAL MANUFACTURING AT THE LAC LABELLE SITE, MICHIGAN

Recent excavations at an aboriginal copper gathering site in Keweenaw County, Michigan (20KE20) suggest sporadic light use by metal workers as early as A.D. 450. Unfortunately for science, relic collectors removed countless numbers of large copper artifacts from archaeological contexts before

professional excavation began. But the remaining concentrations of bits and pieces of native copper suggested that accretional as well as reductive manufacturing processes were important to native users. Optical analyses of whole artifacts from the site can refine or refute this suggestion.

Martin, S. R. (see Martin, P. E.) [76]

Martinez, Muriel Alejandro (INAH)

[4] LATE FORMATIVE HOUSEHOLD MIDDENS AT DON MARTIN, CHIAPAS, MEXICO

The Archaeological Salvage Project at the La Angostura Hydroelectric Reservoir involved archaeological survey and excavations in the Upper Grijalva River in Central Chiapas. During the fieldwork, two major Late Formative period refuse pits were excavated at Don Martin. These midden deposits were accumulated in a very short time frame, and include all classes of organic subsistence remains as well as general household items. An understanding of these midden assemblages provides clues to Formative lifeways. I examine the midden constituents in an effort to reconstruct the activities of this Late Formative community in the Grijalva Basin.

Maslowski, Robert F. (US Army Corps of Engineers-Huntington) and Mark F. Seeman (Kent State)

[5] WOODLAND ARCHAEOLOGY IN THE MID-OHIO VALLEY: SETTING PARAMETERS FOR OHIO MAIN STEM AND TRIBUTARY COMPARISONS

Major environmental and historical patterns represented in the Mid-Ohio Valley proper are contrasted with those patterns in its main tributaries. The importance of micro-environmental variability such as topography, physiography, basin hydrology, soil variability, and length of growing season are emphasized in reference to general patterns of Woodland adaptation. Environmental background is presented for the detailed discussions of Woodland archaeology which follow.

Mason, Carol (Wisconsin-Fox Valley)

[58] FROM THE OTHER SIDE OF THE LOOKING GLASS: WOMEN IN AMERICAN ARCHAEOLOGY IN THE 1950'S

In the rush to celebrate advances in the position of women in archaeology, the presence and contributions of foremothers stand in danger of being neglected and forgotten. The contributions of some of these women are considered, especially for the East and Southeast in the 1950's.

Masucci, Maria (Southern Methodist) and Elizabeth J. Reitz (Georgia)

[73] SHELL BEADS AND SHARK TEETH: UTILIZATION OF MARINE RESOURCES DURING THE GUANGALA PHASE, SOUTHWEST ECUADOR

Survey and excavation 25 kilometers inland in the El Azucar River Valley, southwest Ecuador, indicate a strong marine orientation in subsistence during the Regional Development period (Guangala Phase). These new data suggest that interdependence between coastal and inland dwellers is the key to understanding adaptation to a semi-arid environment. In addition, the investigation of the Guangala Phase in El Azucar shows changes in settlement with increasing site size and number and appearance of a new economic activity with the manufacture of shell ornaments utilizing raw material from the coast. This evidence raises issues concerning responses not only to the natural environment but the socio-economic environment as well.

Mather, David J. (Minnesota Historical Society) and Robert G. Thompson (Iowa)

[21] THE DAHNKE-REINKE SITE: PREHISTORIC STONE TOOL USE IN THE RED RIVER VALLEY

The Dahnke-Reinke site (32CS29) is a multi-component Woodland occupation with a variety of associated stone tool types. An experimental use-wear study of Knife River Flint serves as a basis for determining the tools' functions. The experimental flakes and artifacts are analyzed and compared using incident light and scanning electron microscopy. Utilization damage and microwear polishes provide insights about the uses of scrapers, points, bifaces, and retouched flakes from the site. Phytoliths adhering to the tool edges add further information regarding plant use. The resulting knowledge aids significantly in understanding the specific roles of these artifacts in subsistence and daily life at the site.

Mathien, Frances Joan (National Park Service and New Mexico)

[58] WOMEN OF THE CHACO: THEN AND NOW

From 1929-1935 and again from 1971-1978, two major archaeological projects were carried out in Chaco Canyon, New Mexico, both affiliated with the University of New Mexico. The former was a joint project with the School of American Research and the latter with the National Park Service. The similarities and differences in the institutions involved, their research goals and programs, and the role that women played during each period are examined. Specific topics addressed include a comparison

of the percentage of women versus men as teachers, supervisors, or students; percentages of degrees at the Ph.D. and M.A. levels obtained by participants in these projects; and future directions taken by these women after they left Chaco.

Mathis, Mark A. (Office of the State Archaeologist-North Carolina)

[63] THE FUTURE OF STATE ARCHAEOLOGY IN NORTH CAROLINA: A PROGNOSIS

The State of North Carolina has long been a staunch supporter of archaeology and historic preservation. Even during the lean federal years of the 80's, State support held fast, with level funding, new State preservation legislation, and an overall maturation of the State in CRM and archaeological research. The future, however, remains uncertain. Some of the many problems still facing us are examined, including expanding development pressures and a dwindling resource base, changing research priorities and directions, and public education and perception. In addition, the problem of sea level rise and shoreline erosion is discussed.

Mauldin, Raymond (New Mexico) and Steve A. Tomka (Texas)

[8] AN ETHNOARCHAEOLOGICAL ASSESSMENT OF GRINDING EFFICIENCY AND GROUND STONE SIZE

Relationships between ground stone size and grinding efficiency are implicit in arguments relating ground stone to levels of agricultural dependence. Data from recent ethnoarchaeological investigations among agropastoralists in Bolivia, who process corn and chenopodium using traditional grinding equipment, suggests that increasing mano area does reduce grinding time. The reduction in grinding time is not a simple linear function of increasing mano size, and the form of the relationship is grain dependent. Models of agricultural intensification which rely on ground stone size are assessed in light of these findings.

Maut, L. A. (see Cochran, D. R.) [64]

May, E. M. (see MacKinnon, J. J.) [25]

May, J. Alan (Schiele Museum of Natural History)

[7] ARCHAEOLOGICAL SHELL MIDDENS: FIELD EXPERIENCE WITH SITE FORMATION MODELS

Excavation methods of archaeological shellmiddens are conditioned not only by implications of research hypotheses but also by the models of midden formation available to the archaeologist. New techniques in computer analyses of large bodies of data as well as advances in remote sensing techniques add new, complex, dimensions to midden interpretation as well as increase the probability of introduced errors—both in data manipulation and interpretation. I describe midden excavations in freshwater and marine environments as examples of shifts in excavation methods based on insights derived from the use of computers to analyze data, the use of ethnographic accounts, and the use of high technology appliances.

May, J. A. (see Levy, J. E.) [1]

McAllister, Martin (Archaeological Resource Investigations) [Discussant 23]

McAnany, Patricia (Boston)

[4] ECONOMIC STRATIFICATION AMONG AGRICULTURAL HOUSEHOLDS IN PREHISTORIC MAYA SOCIETY

The prehistoric Maya structures ringing Pulltrouser Swamp in Northern Belize have been characterized as the residences of the agriculturalists who constructed and farmed raised fields in the adjacent swamp zone. Stone tools and debitage, diagnostic of these agricultural activities, have been documented for the swamp community as a whole. Now data from both test excavations and horizontal exposures are employed to explore the household-by-household variability in the agrarian labor force. The central tenet of this research—that economic stratification within these agricultural communities will be reflected in a positive association between the scale of the residential unit and the frequency of discarded agricultural tools and debitage—is evaluated.

McCafferty, G. G. (see Hoopes, J. W.) [62]

McCartney, Allen P. (Arkansas) and James M. Savelle (McGill)

[43] THULE ESKIMO BOWHEAD WHALE SELECTION: A ZOOARCHAEOLOGICAL ANALYSIS

Zooarchaeological investigations to determine bowhead whale age/size selection by prehistoric Thule Eskimos (ca. 1000-1600 A.D.) were conducted in five different regions in the Canadian High Arctic in 1978 and 1988. Within these regions, which represent both "core" and "peripheral" bowhead whale ranges, measurements were made on approximately 2,000 bone elements representing a

minimum of over 800 individual whales. The results indicate that although there was an overall selection for yearlings, there was a tendency in peripheral regions to include older, larger whales. The implications of this selection pattern are discussed.

McCartney, Peter H. (Calgary)

[70] THE ANALYSIS OF PREHISTORIC SETTLEMENT SYSTEMS IN THE CANADIAN HIGH ARCTIC

Catchment analysis and related geographic techniques are applied to sites located in Jones Sound, Northwest Territory. Methodological considerations for using such approaches to study arctic hunter-gatherer settlement behavior are discussed. Results are used to form inferences at three levels: 1) reconstruction of individual site economic focus, 2) inter-site variability, and 3) gross temporal changes in settlement and economic strategies.

McCormack, William A. (UC-Berkeley)

[10] THE EMERGENCE OF LONG DISTANCE STONE PROCUREMENT SYSTEMS IN STONE AGE INDIA

Recent research establishes the Son valley in north-central India as the source of stone for late prehistoric hunter-gatherer sites on the Gangetic Plain. This discovery doubles previous size estimates of South Asia's largest known hunter-gatherer procurement system to 160 kilometers. The research also establishes the Son as the probable source of materials at Chalcolithic sites near the Nepal border, 250 kilometers north of the Son. A revision of procurement history is presented in which it is shown that long-distance lithic procurement begins in the Upper Paleolithic and subsequently expands until well after the appearance of sedentary food production.

McCorriston, Joy (Yale)

[59] ENVIRONMENT, FARMING, AND MOBILITY IN THE KHABUR DRAINAGE

A focus on the environmental and economic contexts of charred plant remains recovered from Tell Aqab and Umm Qseir allows examination of prehistoric uses of resources from a range of different ecological niches in the Khabur drainage. Both sites have an Halaf component, but Tell Aqab lies in a dry-farming landscape while only irrigation agriculture is practical at Umm Qseir. Linking these sites even hypothetically allows us to examine an economic system in an environment punctuated by seasonal resource availability and human mobility.

McCorvie, M. R. (see Wagner, M.) [54]

McCutcheon, Patrick (Washington)

[17] TECHNIQUES FOR INVESTIGATING HORIZONTAL AND VERTICAL DIMENSIONS OF ARCHAEOLOGICAL DEPOSITS: AN HISTORICAL REVIEW

Beginning in the early part of the 19th century, the manner in which North American archaeologists have conceptualized archaeological deposits has changed significantly. Inquiry into spatial relationships, both vertical and horizontal, has changed as well. Techniques for collecting spatial data from archaeological contexts have been little modified since their initial use. A review of archaeological literature suggests that current conceptualization of archaeological deposits demands a reevaluation of the techniques and units of analysis for spatial investigations in archaeological contexts.

McDougle, Eugene (Museo Antropologico del Banco Central del Ecuador)

[50] MANGROVES AND SAND DUNES: CHANGING ECONOMIES ALONG THE CHANGING PREHISTORIC SHORELINES OF SOUTHWEST ECUADOR

The southwest coastal region of Ecuador has been discontinuously occupied for at least 10,000 years. Many early sites are located on elevated ground near dry bays or other low areas that in the past were probably fringed by mangrove swamps. Uplift and barrier dune building may have played a significant role in the disappearance of these swamps. Evidence from the early sites indicates these mangrove areas had been an important economic resource which was no longer available to later inhabitants. Most of the later period sites are located near the contemporary shoreline or in river valleys. Near shore and intertidal resources could be exploited and agriculture, long practiced in prehistoric southwest Ecuador, probably increased in economic importance.

McEwan, Colin (Illinois)

[42] THE INCA RITE OF CAPAC HUCCHA: DEFINING THE SACRED AND POLITICAL GEOGRAPHY OF EMPIRE

The newly published full version of Betanzos provides us with detailed descriptions of the rituals carried out upon the death of an Inca and the succession of a new king. Pairs of children (*capac huccha*) were sacrificed and interred accompanied by suites of miniature vessels and votive figurines in gold

and silver, first in the immediate environs of Cuzco, then throughout the four quarters of the empire. These sacrificial burials were placed at important points in the sacred geography of the empire that the Inca had visited during his reign, serving both to imprint Inca cosmology and mythology on the landscape and to delimit Inca hegemony. I assemble the evidence for such dedicatory offerings to explore the archaeological correlates and implications of the *capac huccha* rite.

McGovern, P. E. (see Swan, C. P.) [39]

McGowan, Kevin P. (Illinois)

[60] CULTURAL INTERACTION AT THE WOODFORDIAN MARGIN DURING THE LATE WOODLAND AND MISSISSIPPIAN PERIODS IN ILLINOIS

The time segment A.D. 600-1200 spanned an era when subsistence strategies and social organization were dramatically changing throughout much of the Midwest. This "Mississippian Development" has primarily been recognized along the Mississippi River and its main tributaries. The Woodfordian Northeast, the area covered by the maximum expanse of the Woodfordian glaciation, physiographically is poorly suited to the cultural adaptations associated with Mississippian societies. Data sets are examined from localities along the margin of the Woodfordian Northeast to suggest both the nature of local social organization and the relationship to social groups in the major river valleys.

McKillop, Heather (Trent)

[26] COASTAL MAYA TREE-CROPPING AT WILD CANE CAY, BELIZE

Analysis of abundant plant remains recovered from water-logged deposits at Wild Cane Cay, southern Belize provides new insights into our knowledge of the Classic and Early Postclassic coastal Maya diet. Recovery techniques, quantification methods, and evaluation of dietary importance of the plant remains are discussed. In contrast to inland communities where cultigens such as corn dominate the plant food part of the diet, the Wild Cane Cay Maya relied extensively on tree crops—particularly several palm nut species and edible tree fruits. The significance of the Wild Cane Cay plant data in terms of current knowledge of ancient Maya subsistence is addressed.

McKillop, H. (see Ellis, C. J.) [64]

McManamon, Francis P. (National Park Service)

[7] THE SPATIAL DIVERSITY OF REMAINS IN PREHISTORIC SHELL MIDDENS

Deposits of shell in plowzone and subplowzone archaeological contexts are common among the approximately 75 prehistoric site areas discovered by the Cape Cod National Seashore Archaeological Survey. The densest shell deposits occurred in relatively small portions of site areas. The total area with some shell spread over it was, on the other hand, relatively large. Historic plowing and prehistoric activities are responsible for some of this widespread distribution. In at least some cases the dense shell deposits occur in areas where natural depressions seem to have existed initially. Descriptive material is presented to form a basis for comparative analysis of shell middens and sites with widespread shell from elsewhere.

McManamon, F. P. (see Smith, G.) [63]

Meadow, Richard H. (Peabody Museum-Harvard), Bryan C. Gordon (Canadian Museum of Civilization) and Michael R. Toplyn (Harvard)

[30] AN APPROACH TO THE STUDY OF INCREMENTAL STRUCTURES IN MAMMALS

Techniques for the preparation and examination of incremental structures in mammalian teeth using transmitted light microscopy have been perfected at the Archaeological Survey of Canada by Sterling Presley and at MIT (CMRAE) by Christopher Craig. Through the efforts of Presley and Guy Pollard (MIT), a joint protocol has been developed and applied by the authors and students to teeth from caribou, pig, sheep, goat, cattle, dog, and New World deer in order to document the season of and age at death. Results of these analyses are presented and problems of technique and interpretation are discussed.

Medaglia, Christian (Harvard), Elizabeth A. Little (Nantucket Historical Association) and Margaret J. Schoeninger (Harvard)

[67] LATE WOODLAND DIET ON NANTUCKET ISLAND (MASSACHUSETTS): A STUDY USING STABLE ISOTOPE RATIOS

A question concerning the diet of the Late Woodland period inhabitants on Nantucket involves the presence or absence of maize in their diet. Results from three human skeletons ($\delta^{13}C = -10.6$ o/oo) suggest the inclusion of C4 plants or marine foods. A study of potential food items from various environments on the island (fresh water ponds, salt marsh, estuaries, open ocean, heath, dunes and upland) revealed no indigenous C4 plants and only one CAM plant (prickly pear). The average terrestrial plant value (excluding prickly pear) was -21.2 o/oo, while marine values average -16.9 o/oo. Possible

explanations for the humans' high carbon signature include: a 100 percent marine diet (unlikely), unique fractionation in humans, or dependence on CAM or C4 plants.

Mees, Geoffrey C. (Maidenhead), S. Ford (Reading), M. Bowden (RCHME) and V. Gaffney ()

[16] THE DATE OF "CELTIC" FIELD SYSTEMS ON THE BERKSHIRE DOWNS, ENGLAND

Field systems on chalk downland were dated by excavated surviving lynchets. The positions of potsherds derived from manuring, were recorded in trenches cut where possible across major axes of the systems. Environmental evidence was obtained from molluscan analysis in some cases. Seventy-five percent of the pots recovered were Roman, six percent prehistoric, and 20 percent were undatable. Sherds in stratigraphically primary levels suggested a Roman *terminus post quem* for nine of thirteen lynchets trenched. Stratigraphy, environmental data, and the morphology of surviving boundaries, indicated a single phase of cultivation in all but one case.

Mehr, Mark and James M. Collins (Office of the State Archaeologist-Iowa)

[36] HOUSEHOLD ARCHAEOLOGY AT CAHOKIA AND ITS HINTERLANDS

An original synthesis of new information about late prehistoric Cahokia and the surrounding American Bottom region is illustrated by changes in the organization of domestic life at Cahokia and several smaller sites. The rise and fall of a complex society is traced by the evolution of households in the regional settlement system. Trends of the spatial organization and composition of domestic facilities "downtown" and in the countryside are characterized by parallel but different trajectories. Data have been derived from work sponsored by the Illinois Historic Preservation Agency at the Cahokia Interpretive Center Tract-II and the Illinois Department of Transportation FAI-270 Archaeological Mitigation Project.

Meier, Marvin C. (U.S. Forest Service-Atlanta) and Kent A. Schneider (USFS-Atlanta)

[27] FIFTEEN YEARS OF CRM IN THE SOUTHERN REGION: AN OVERVIEW

In the mid-1970's, a report was written advising a Forest that cultural resources rules and regulations were intended for the National Park Service. The uphill battle that ensued insured that CRM was to become an ever-dominant force in overall Forest management in the southeast. The present paper discusses the growth of CRM in the Southern Region over the past 15 years—the change from none to more than 20 archaeologists, from zero to more than \$1,250,000 in an annual budget, and what has been done for the money.

Meignen, L. (see Bar-Yosef, O.) [24]

Mellars, Paul A. (Cambridge)

[2] INDUSTRIAL VARIABILITY IN THE SOUTHWEST FRENCH MOUSTERIAN: NEW PERSPECTIVES ON AN OLD DEBATE

Any attempt to explain variability in Middle Paleolithic industries must take account not only of the technological and morphological features of the industries, but also of their patterning through time. In western France there is evidence for a strong element of chronological patterning in the occurrence of several of the most distinctive industrial variants of the Mousterian, and evidence for clear associations with parallel shifts in climatic and ecological conditions. The combination of this evidence can be used to suggest some specific mechanisms for the changing character of Mousterian industries at different stages throughout the Mousterian succession.

Meltzer, David (Southern Methodist)

[32] ALTTHERMAL ARCHAEOLOGY ON THE SOUTHERN HIGH PLAINS

The discovery of an Altitheal-age wellfield at Mustang Springs (west Texas) provides striking evidence of early to middle Holocene climates and hydrology, and the human adaptive response to long term drought on the southern High Plains. It implies a far more extensive human presence during this episode than previously suspected. But such evidence raises questions about human adaptive strategies that can be answered only partly by the record at Mustang Springs. The Mustang Springs wellfield, however, is surely not unique, and its location, deeply buried in a geological low within Mustang Draw, help explain why sites of this age are so scarce, and what might be done to detect them.

Merrill, W. (see Hard, R. J.) [8]

Metcalfe, Duncan (Utah)

[41] A GENERAL COST/BENEFIT MODEL OF THE TRADEOFF BETWEEN TRANSPORT AND FIELD PROCESSING

Field processing of resources prior to transporting them back to residential bases is a common activity among collectors. Effort expended in field processing typically reduces the effort required to transport a usable unit of the resource. Under many circumstances, effort spent in field processing versus

transport can be conceptualized as a trade-off which has an optimal solution. A simple optimality model is presented which predicts the solution to this tradeoff, and which demonstrates how this will vary by resource and transport distance. The utility of the model is examined for animal and lithic procurement.

Metzger, M. C. (see Falconer, S. E.) [46]

Michaels, G. H. (see Voorhies, B.) [7]

Michaelsen, J. (see Larson, D. O.) [37]

Michlovic, M. (see Schneider, F.) [32]

Miksicek, C. (see Pohl, M.) [26]

Miller, James J. (Florida Bureau of Archaeological Research)

[63] CRM 2000

Cultural resource management, as it is now practiced in the United States, has mainly developed in the short period since the passage of the National Historic Preservation Act twelve years ago. This paper addresses some of the accomplishments and shortcomings of the field, as it now exists, and attempts to determine its directions through the 1990's. From the perspective of a rapidly developing Southeastern State, the effects of federal, state, and local programs will be assessed with a view toward offering recommendations for improvements in managing and interpreting archaeological resources.

Miller, Julia (Pennsylvania), Edward M. Schortman and Patricia A. Urban (Kenya)

[56] MIDDLE PRECLASSIC REMAINS AT THE SITE OF SANTO DOMINGO, NACO VALLEY, HONDURAS

Santo Domingo's 1979 excavations indicated that a raised area about 40 meters in diameter resulted from midden accumulation. The deposit was dated to the Middle Preclassic on typological grounds; no C14 samples or structures were recovered. Reexamination in 1988 confirms the area's midden origin and date. A cobblestone platform was found sealed below a collapsed bajareque structure, and itself covering more midden deposits. This platform is one of the oldest structures found to date in Honduras and suggests that early Naco Valley occupation was substantial and may have been socially differentiated.

Miller, Mark E. (Office of the State Archaeologist-Wyoming), George C. Frison and Kyle C. Baber (Wyoming)

[40] CONTINUING INVESTIGATIONS AT THE FINLEY PALEOINDIAN SITE IN SWEETWATER COUNTY, WYOMING

The Finley site is a Cody Complex bison kill/butchery locality initially investigated by the University Museum of Philadelphia and Nebraska State Museum prior to World War II. In the early 1970's, and again in 1987, the University of Wyoming and the Office of the Wyoming State Archaeologist located additional Cody Complex artifacts in a vandalized bonebed about 200 meters north of the Pennsylvania excavations. This paper discusses the relationship between the two localities and compares the lithic and faunal assemblages. Directions for future research at the Finley site are also considered.

Milner, G. R. (see Wood, J.) [57]

Minnis, Paul (Oklahoma)

[12] CHANGES IN PREHISTORIC-HISTORIC FOOD PATTERNS IN THE SOUTHWEST

Ethnographic food patterns for the Southwest differ somewhat from the southwestern paleoethnobotanical record. One major change seems to be in the least preferred foods, famine foods. Major modern famine foods appear to have been dietary items for prehistoric peoples of the region. These include seeds of small annuals, cacti fruits, century plant, reproductive structures of perennials, and various leguminous resources. It is argued that the prehistoric-historic shift in resource preference has followed a regular and predictable pattern.

Misner, Elizabeth J. (Georgia)

[69] A REGIONAL ANALYSIS OF LITHIC SITE DISTRIBUTION IN THE VALLEY OF OAXACA

Data from a regional survey of the Valley of Oaxaca Mexico is analyzed for indications of craft specialization of locally available lithic materials. The amount and types of lithic artifacts are compared by rank and size of the sites. Production and distribution of ceramics and the association of imported obsidian are compared to the presence and function of local lithic artifacts. Two systems of lithic use and production are present. Distribution patterns and large lithic production areas are shown to reflect

societal shifts from Classic to Postclassic. Evidence is also present for continuing use of lithic resources at household scales.

Mistovich, Tim S. (Alabama)

[36] TOWARD AN EXPLANATION OF VARIATION IN MOUNDVILLE PHASE HOUSEHOLDS IN THE BLACK WARRIOR VALLEY, ALABAMA

The distinct demography of domestic sites, as opposed to civic-ceremonial sites, of the Mississippian period Moundville phase in Alabama has emerged from recent analyses of settlement patterns. A small set of excavated households from both site classes has provided evidence for equally distinct divisions in architecture and the composition of artifact assemblages. These data provide a springboard for the explanation of variation in Moundville phase households. We can now begin to consider the implications of household function within this two-tiered settlement system with regard to changing social, political, and economic structures during the transition from Late Woodland village life to the dispersed agricultural system of the Mississippian period.

Mitchem, Jeffrey M. (Florida Museum of Natural History)

[1] INITIAL SPANISH/INDIAN CONTACT IN WEST PENINSULAR FLORIDA: THE ARCHAEOLOGICAL EVIDENCE

The western part of peninsular Florida was the starting point for Spanish exploratory expeditions in 1528 and 1539. This region was the first place within the present continental United States where major interaction between Spaniards and Native Americans occurred. Recent archaeological research focused on this era in Florida has been carried out in two ways: 1) study of private and museum collections from previously excavated sites; and 2) problem-oriented excavations. This research has led to the identification of several sites with evidence of initial Spanish/Native American interaction and its consequences. These include the Weeki Wachee, Ruth Smith, and Tatham Mounds.

Monks, Gregory (Manitoba)

[30] METHODS OF ANALYZING GROWTH INCREMENTS IN BISON TEETH

Different methods of preparing and analyzing Bison teeth are evaluated. Growth increments in modern samples of known age and date of death are examined and then compared with archaeological samples from the Stott site and Head Smashed In. The strengths and weaknesses of each method and sample are evaluated.

Moore, D. (see Graves, M. W.) [74]

Moore, D. G. (see Levy, J. E.) [1]

Moore, Michael (Tennessee Division of Archaeology)

[33] A REVIEW OF THE TENNESSEE STATE CEMETERY LAW AND ITS IMPACT UPON PREHISTORIC SITE PRESERVATION

The looting of prehistoric Indian graves in Tennessee has long been viewed as a socially acceptable hobby with considerable financial benefits. Recent interpretations of the state cemetery law, however, provide prehistoric graves the same protection and consideration as historic interments. Past and present applications of the law toward prehistoric sites with human remains are examined. Strengths and weaknesses of the current law, from the viewpoint of the professional archaeological community, are also provided.

Morey, Darcy F. and Walter E. Klippel (Tennessee)

[43] SUBSISTENCE ACTIVITIES OF HUMANS AND CANIDS: ANALYSIS OF DEER BONE FROM A LATE MIDDLE ARCHAIC SHELL MIDDEN IN MIDDLE TENNESSEE

Taphonomic analysis of identified white-tailed deer bone from the Hayes site (40ML139), a late Middle Archaic shell midden in middle Tennessee, reveals that nearly one of every four bones exhibits direct evidence of canid scavenging in the form of gnawing marks or chemical erosion resulting from passage through the digestive tract. However, bones characterized by dense, compact structure, and thus most resistant to canid modification, are present in frequencies higher than less resistant bones. Relative frequencies of anatomical parts as well as fragmentation patterns resulting from human activities have been dramatically altered by the subsistence activities of scavenging canids.

Morrison, Kathleen (UC-Berkeley)

[10] URBAN AGRICULTURAL PRODUCTION IN SOUTH INDIA

The region surrounding the medieval south Indian city of Vijayanagara supported a vast and diversified agricultural system, whose development reflected the rapid growth and abandonment of this population center. Preliminary results from a regional survey of the Vijayanagara hinterland reveal a system of agricultural production consisting of at least three distinct components, each supporting a

particular array of crops, and each involving different implications for labor organization and settlement distribution. This complexity of productive organization, together with the rapid and dynamic changes in that organization argue against the use of simplistic models of intensification in analyzing Vijayanagara economic structure.

Morse, Dan F. and Phyllis A. Morse (Arkansas Archeological Survey)

[1] THE SPANISH DISCOVERY AND EXPLORATION OF "AKANSEA"

The De Soto expedition spent two years in what is the present state of Arkansas. Over half of the state was explored and virtually all major Protohistoric Native American polities visited. Spanish impact on those populations is gleaned from the De Soto accounts, the 1673 Marquette map, and archaeological remains.

Morse, P. A. (see Morse, D. F.) [1]

Moseley, Michael (Florida), David Wagner (Space Remote Sensing Center) and James B. Richardson, III (Carnegie Museum of Natural History)

[50] SPACE SHUTTLE IMAGERY OF SHORELINE ALTERATION PROCESSES ON THE PERUVIAN COAST

Large Format Camera Space Shuttle imagery taken in 1984 combined with earlier aerial photography spanning more than three decades supports the hypothesis that recent beach ridges are signatures of episodic "Radical Environmental Alteration Cycles" entailing El Niño flooding of tectonically disturbed landscapes. This suggests that earlier beach ridges identify episodes of extreme stress on human settlement and subsistence systems.

Moseley, Michael (Florida) [Discussant 6]

Mountjoy, Joseph (North Carolina-Greensboro)

[7] MACRO AND MICRO SCREEN SAMPLING OF A MIDDLE FORMATIVE SHELL MIDDEN AT SAN BLAS, NAYARIT (MEXICO)

Excavations conducted 15 years apart (1968 and 1983) at the same site but using different extensive and intensive sampling strategies have resulted in different data recovery and consequent interpretations regarding the cultural/ecological adaptation by the past inhabitants. Most significant for reinterpretation have been the data resulting from micro-screening and flotation. These methods, which were employed in the 1983 project but not in the 1968 one, resulted in significantly different recovery of bone, shell, charcoal, coprolites and cultural remains, and have led to new conclusions about the cultural system of the Middle Formative inhabitants.

Mueller, Marilyn (Colorado)

[75] DIGITAL IMAGE PROCESSING OF REMOTE SENSING DATA FOR SETTLEMENT PATTERN STUDIES IN NORTHWESTERN COSTA RICA

Throughout the tropics, settlement pattern studies have long been problematic due to dense vegetative cover, which often renders traditional field survey methods and sampling designs infeasible. Digital image processing of Landsat Thematic Mapper data from northwestern Costa Rica, integrated with digitized ecological data, has been applied to various aspects of this problem: 1) assessing the degree of site visibility; 2) mapping vegetation types to determine appropriate field survey methods; and 3) delineating environmental characteristics for stratified random sampling and analysis of settlement locations. Specific techniques, including band ratioing, principal components analysis, decorrelation stretches, and classification are evaluated and results of field verification presented.

Mueller, R. G. (see Joyce, A.) [69]

Mulholland, Mitchell T. (Massachusetts)

[54] ACCULTURATION AND CONTINUITY AMONG EIGHTEENTH CENTURY NATIVE AMERICANS IN SOUTHERN NEW ENGLAND

Sites containing evidence of protohistoric Native American culture are seldom encountered in northeastern North America. The Simons site, in Mashpee, Massachusetts, was occupied by a family of Native American mariners during the eighteenth and nineteenth centuries. Protohistoric ceramics from the site, similar to low-fired colonial redware, occur with lithic artifacts, shell, faunal remains and eighteenth century stonewares, delftwares and clay pipes. These materials and their associations provide evidence of both acculturation and the continuity of Native American traditions into the historic period as the family adapted to Euro-American lifeways.

Mulholland, Susan (Minnesota)

[49] GRASS OPAL PHYTOLITH PRODUCTION: A BASIS FOR ARCHAEOLOGICAL INTERPRETATION IN THE NORTHERN PLAINS

Paleoethnobotanical and paleoecological analyses of grass phytoliths from sediments at archaeological sites have relied heavily on published correlations of phytolith shapes and grass taxa. A recent study of native grasses from central North Dakota indicates that while these correlations are generally accurate, significant deviations do occur. Inflorescence material particularly displays different patterns. Modified correlations of grass taxa and phytolith shapes are proposed that reflect phytolith production more accurately. Further refinements are expected as additional grasses are examined. Identification of phytoliths from archaeological sites should be as detailed and accurate as possible to provide sound data for cultural interpretations.

Muller, Jon (Southern Illinois-Carbondale)

[71] CHAOS IN ARCHAEOLOGY: PROMISES AND CAUTIONS

The newly developing discipline of "Chaos"—disciplined chaos within dynamic systems—has much to offer archaeological research, description, and explanation. Chaos theory offers fruitful and useful models for many phenomena sometimes dismissed as "noise" such as oscillations in organizational states, the relation of organizational complexity to "collapse" of cultural systems, and the role of unpredictability in adaptation. At the same time, useful application of chaotic theory to anthropology and archaeology will require mathematical sophistication in order to avoid this approach becoming merely a source of metaphorical inspiration as has happened with some previous archaeological "fads."

Munson, Patrick J. (Indiana) [Discussant 5]

Murowchick, Robert E. (Harvard)

[3] FROM THE GROUND UP: ORE DISTRIBUTION AND SUBREGIONAL VARIABILITY IN THE BRONZE AGE OF SOUTHWEST CHINA

In the three decades that scientific archaeology has been actively practiced in southwest China, a number of major bronze traditions have been identified. The cultural expression of bronze metallurgy throughout this region involved both innovative internal change and diverse external influences. The picture now emerging shows southwest China to have been a major crossroads enjoying extensive contacts with cultures from the Asian steppes, northwest China, and mainland Southeast Asia. A combined study of bronze metallurgy and mineral resources suggests that uneven ore distribution played a major role in shaping these cultural relationships.

Murray, Matthew L. (Harvard)

[34] IRON AGE TRANSFORMATIONS: SETTLEMENT PATTERN ANALYSIS AND THE CHANGING SOCIO-CULTURAL ORGANIZATION OF SPACE IN SOUTHERN GERMANY

In connection with the investigation of the late Iron Age center of Kelheim, West Germany, research has been undertaken on the development of settlement from the late Bronze Age to the late Iron Age in southern Germany. The locational patterning of these settlements, and their relationships to other sites, such as cemeteries and ritual enclosures, is analyzed. The research is cross-temporal to take into account the cumulative spatial symbolism and historical meanings of locations. Through this perspective in landscape analysis the attempt is made to elucidate the socio-cultural organization of space in Iron Age Germany, and the processes of change in society and its spatial expression.

Murray, M. L. (see Robinson, R. A.) [67]

Myers, James T. (Vanderbilt)

[35] NEW EVIDENCE ON THE EVOLUTION OF REGIONAL ECONOMY ON THE SOUTH COAST OF GUATEMALA

Fundamental to the study of complex societies in Mesoamerica is an understanding of early economies and village specialization and their role in the evolution of local and regional exchange networks. On the Pacific Coast of Guatemala, evidence from the Early Preclassic site of El Mesak offers new insights into the development of local exchange systems. Initial ceramic analysis suggests that from the site's earliest occupation, salt production played an important role in the evolution of economic complexity. This interpretation is discussed in the light of other recent evidence on Early Formative exchange systems and social complexity.

Myler, E. (see Zeder, M.) [59]

Nash, David T. (New Mexico)

[17] SPATIAL PATTERNING AND SITE FORMATION PROCESSES AT HAYSTACK CAVE

Haystack Cave is an archaeological-paleontological site containing late Pleistocene-Holocene deposits, located in southwestern Colorado. These deposits are quite variable and are characterized by a high degree of bioturbation, the chemical and mechanical weathering of the surrounding bedrock, and the presence of large concentrations of faunal remains, putative artifacts, and numerous pebble sand cobbles. Use of multiple procedures is emphasized to 1) evaluate the validity of a pre-12,000 year old occupation at the site and 2) define the taphonomic effects of a variety of geological and biological depositional processes active in the formation of the site's deposits.

Nass, Jr., J. (see Yerkes, R. W.) [36]

Neff, Hector (Smithsonian)

[56] EPISODIC CERAMIC DEVELOPMENT IN PACIFIC COASTAL GUATEMALA

Discontinuities are evident in the Pacific coastal Guatemalan ceramic sequence at several points in time, especially around A.D. 250. Gradual development of Late and Terminal Formative period ceramic traditions was truncated around that date, and vigorous new traditions emerged subsequently. Two types of evidence support this interpretation: 1) stylistic contrasts, and 2) evidence from neutron activation analysis that suggests discontinuities in resource use. It is argued that ceramic traditions in coastal Guatemala passed through a historical bottleneck or filter around A.D. 250. Possible disruptive events for this particular case are mentioned along with a general argument that ceramic evolution is normally episodic rather than gradual.

Nelson, Margaret (SUNY-Buffalo)

[61] PREHISTORIC STRATEGIES OF LAND USE IN SOUTHERN NEW MEXICO: A TECHNOLOGICAL APPROACH

The addition of agriculture to a hunting-gathering economy may result in a variety of land use strategies in an arid to semi-arid environment where intensive dependence on agriculture is problematic. This paper reports on a regional analysis of land use patterns of prehistoric agriculturalists in southern New Mexico. Particular attention is paid to the extent and organization of mobile aspects of land use. Data on stone tool design and tool reduction practices are used to assess these strategies.

Netherly, Patricia J. (Banco Central del Ecuador, Museo Antropologico)

[73] FEASTS AND FANCY WARES: JAMBELI CEREMONIAL MIDDENS FROM THE POZA SANTA MARIA SITE, ARENILLAS VALLEY, ECUADOR

Four asymmetrically ranked areas of ceremonial midden have been located and excavated at the Jambeli Period Poza Santa Maria Site in the Lower Arenillas Valley. Jambeli sites, first reported on the mangrove littoral as specialized marine stations, have now been found well inland in agricultural contexts. The favorable conditions of preservation in the midden offer new information about Jambeli subsistence. The spectacular pottery recovered indicates a ceremonial function and new information on the socio-political organization of this society.

Neumann, Loretta (Society for American Archaeology) [Discussant 23]

Neusius, Phillip (Indiana University of Pennsylvania) and Lynne P. Sullivan (New York State Museum)

[68] IN SEARCH OF THE ERIE

Little is known about the Erie Indians who were eliminated by the Seneca Iroquois during the mid-17th century. The New York State Museum has initiated a research program in southwestern New York aimed at defining this group's place in culture history. Excavations in the early part of this century were limited to the burial pits and associated ceramics. Recent excavations at the Ripley site provide the first evidence of settlement patterns and subsistence practices for this group. Results of the first season's investigations reveal the presence of longhouse structures and suggest ties with Iroquois groups to the north.

Neusius, Sarah W. (Indiana University of Pennsylvania)

[68] PROHISTORIC HUNTING STRATEGIES IN SOUTHWESTERN NEW YORK STATE: THE EVIDENCE FROM THE RIPLEY SITE

Although there is little question that the subsistence base of Late Prehistoric, Protohistoric and Historic Iroquoian groups in the Northeast was essentially horticultural, the interrelationship of animal exploitation and food production seldom has been investigated. Recent analysis of faunal remains from the Ripley Site, a Protohistoric village on the Lake Erie bluffline in extreme southwestern New York, has provided an opportunity to evaluate this interrelationship. Information on the relative usage of

aquatic and terrestrial habitats and on the reliance on hunting strategies such as garden hunting now is available.

Nicholas, Ilene M. (Hobart and William Smith) and Elizabeth Henrickson (Royal Ontario Museum)
[46] FUNCTIONAL ANALYSIS OF AL-QESIR, AN EARLY BRONZE AGE TRANSJORDANIAN SITE

Preliminary mapping and soundings of the fortified but apparently largely non-residential later Early Bronze Age site of al-Qesir, in the fertile Ba'ah valley, just north of Amman, Jordan, suggests that the broad concepts "urban" and "rural" are not helpful in interpreting the site's function and settlement context. Comparisons with other Early Bronze data from Palestine suggest that this 3.5 hectare site offers a unique constellation of features (including 43 enigmatic tumuli, at least three cisterns, and several rectangular buildings) which may be more profitably investigated at a lower level of interpretation, involving activity analysis and reconstruction of organizational foci.

Nicholas, L. (see Feinman, G.) [29]

Nicholson, Paul and Helen Patterson (Sheffield)
[29] THE BALLAS POTTERY PROJECT: ETHNOARCHAEOLOGY IN UPPER EGYPT

The production of amphora-like vessels at the village of Deir el-Gharbi near Ballas in Upper Egypt is examined, using the work of the Ballas Pottery Project. This center produces a single type of vessel using traditional technology and a clay source that has been exploited since pre-pharaonic times, which must place it among the oldest potting sites in Egypt. The archaeological correlates of pottery production at the village are examined and related to actual excavated potting installations. The stages of production and distribution of these vessels and their significance to archaeologists are also discussed.

Nieves, A. (see Arnold, D. E.) [29]

Niquette, Charles M. (Cultural Resources Analysts)
[5] EARLY/MIDDLE WOODLAND SETTLEMENT PATTERNS IN THE OHIO VALLEY

Although the available data are skewed heavily towards mounds and mortuary sites, non-mortuary, Early/Middle Woodland settlement patterns (400 B.C. to A.D. 400) are examined throughout the Mid-Ohio Valley. New data obtained from excavations of two non-mortuary Woodland sites in eastern Kentucky (the Graham and Calloway sites) and extensive survey data from the Big Sandy and Kanawha River drainages is summarized. A regional model is offered to explain Early/Middle Woodland settlement patterns and to aid in the identification of Early/Middle Woodland habitation loci.

Nisbet, R. (see Biagi, P.) [72]

Novick, Andrea (North Carolina Department of Transportation)
[70] LITHIC INFERENCE AND PATTERNED REDUNDANCY AT GATECLIFF SHELTER, NEVADA

Flaked stone tools and debitage from the excavation of Gatecliff Shelter, Nevada, are used to examine site structure and hunter-gatherer mobility/organizational strategies. The analysis results indicate that little post-depositional movement occurs within the deposits. Small artifacts are discarded adjacent to hearths while large artifacts are generally farther from such areas. As a result of site function (patterned redundancy) lithic technology does not change through time. The diachronic homogeneity of the lithic assemblage reflects the constant structure of the site within a temporal variety of mobility strategies.

O'Brien, P. M. (see Rogge, A. E.) [45]

O'Connell, B. H. (see Whelan, M.) [32]

O'Connell, James (Utah)
[41] FACTORS CONDITIONING THE DIFFERENTIAL TRANSPORT OF ANIMAL BODY PARTS AMONG EASTERN HADZA

The last few years has witnessed an increasing number of investigations directed at understanding the factors which condition the differential transport of animal body parts from kill/butchering sites to residential bases. These studies have demonstrated that the range of variation in the types and frequency of elements transported is dramatically greater than envisioned only a decade ago. The potential causes of this variation are examined in light of data collected in 1988 on Hadza hunting, field processing, and transport of large body parts. The archaeological implications of the results are discussed.

Obando, Patricia (Colorado)
[75] SCANNING ELECTRON MICROSCOPE ANALYSIS OF HUMAN SKELETAL MATERIAL FROM COSTA RICA

Human skeletal remains continue to develop importance as a source of direct biological evidence for data on nutrition, health status, and pathologies of prehistoric populations. Reflecting the interest to gain even further data from human skeletal material, a series of analytical techniques have been developed using the SEM and related analytical tools. The analyses which to date have been carried out at the Medical School of the University of Costa Rica represent a breakthrough in physical anthropology in Costa Rica. Results from analyses at three geographically and temporally different sites are presented.

Olinger, B. (see Woosley, A. I.) [14]

Oliva, M. (see Vandiver, P.) [66]

Olsen, Sandra (John Hopkins)
[66] A THEORETICAL APPROACH TO UPPER PALEOLITHIC HORSE HUNTING STRATEGIES AT SOLUTRE, FRANCE

Recently, researchers have begun to expand Paleolithic archaeology beyond the realm of artifact classification and temporal sequences to the reconstruction of past lifeways. Hunting unquestionably played a crucial role in the daily lives and economy of Paleolithic people. The unique topographic setting of the site of Solutre, in addition to the vast deposits of horse skeletons there, provides an opportunity to reconstruct hunting strategies employed from the Late Mousterian to the Final Magdalenian. Dental cementum analysis yields important information about the seasonality of the hunts and scanning electron microscopy facilitates interpretation of butchery and taphonomic alteration.

Olsen, Stanley (Arizona State Museum)
[54] TENTH CENTURY LAMELLAR ARMOR FROM TIBET

On two trips to China in 1986 and 1987, as a guest of the Chinese Academy of Science, the author had an opportunity to visit a number of Buddhist Monasteries in Tibet in relation to a study on the early domestication of the yak on the Tibet-Qinghai Plateau. At that time it was also possible to compare examples of early lamellar body armor that is present in the monastery collections. This is of considerable importance because it adds to our knowledge of Persian influence in the design of arms and armor and trade routes into that area of Tibet.

Olszewski, Deborah I. (Arizona)
[81] HONING THE AHMARIAN TRADITION: AN UPPER PALEOLITHIC SITE FROM THE WADI 'HASA, WEST-CENTRAL JORDAN

Wadi 'Hasa Site 784x represents a series of late Upper Paleolithic occupations at a small rockshelter in west-central Jordan. Cultural remains recovered from test units include chipped stone, hearths, and remarkably well-preserved faunal elements. Typological and technological analyses of the chipped stone suggest that this site is part of the Ahmarian Levantine Upper Paleolithic. As the delineation and acceptance of the Ahmarian is a relatively recent phenomenon, the data from 784x are used to examine the role of this site as a limited activity location within the Ahmarian tradition, and its relationship to the Ahmarian of the Negev and Sinai.

Olszewski, D. I. (see Barton, C. M.) [13]

Ortner, Donald J. (Smithsonian) [Discussant 57]

Otte, Marcel (Liege)
[24] THE SIGNIFICANCE OF INDUSTRIAL VARIABILITY IN THE EUROPEAN MIDDLE PALEOLITHIC

The essential stability of technical processes throughout the Middle Paleolithic periods reflects the remarkable flexibility of these techniques in coping with a variety of different environmental, economic and social constraints. Explanation of Middle Paleolithic industrial variants must therefore take account of these adaptive aspects, as well as distinct regional traditions in technology. Explanations in terms of activity differences, raw materials, environmental adaptations, technological evolution, "traditions" etc. are therefore not mutually exclusive, but rather complementary. Despite variability in these features, the relative stability (or even monotony) of Mousterian variants throughout large areas of Europe seems to reflect a basic unity in the "ethnic" basis of Mousterian populations.

Paine, Richard (Pennsylvania State)

[79] ESTIMATING PREHISTORIC MIGRATION FROM SKELETAL AGE DISTRIBUTIONS: A CASE EXAMPLE FROM COPAN, HONDURAS

Migration has been demonstrated to affect, quantifiably, the age distribution of populations. A procedure is discussed that models the effect of varying degrees of migration on the age-at-death distribution of a population, given specified fertility and mortality rates. The procedure is used to estimate migration patterns for archaeological populations from skeletal samples. Settlement evidence and demographic reconstruction indicate that the ancient Maya site of Copan was a likely recipient of migrants during its rapid growth from 500-800 A.D.; however, this notion has been difficult to document firmly. The procedure is applied to this site in an attempt to better understand development of a major Maya center.

Paquin, Charles P. and Thomas R. Baker (Maine-Farmington)

[77] THE CASCADE FALLS SITE: AN EARLY LATE WOODLAND HABITATION SITE LOCATED IN GORHAM, NEW HAMPSHIRE

Investigations conducted in Gorham, New Hampshire resulted in the identification of three previously unknown aboriginal sites. Of special note, the Cascade Falls site contains a lithic and ceramic assemblage attributable to the early Late Woodland period. In particular, the lithic assemblage recovered there consists primarily of tools and debitage of Mt. Jasper rhyolite obtained from the nearby Mt. Jasper quarry. The relationship of the Cascade Falls site to the Mt. Jasper quarry site is explored and some insights are offered on the lithic reduction technologies of the early Late Woodland inhabitants of the upper Androscoggin River Valley.

Parsons, Jeffrey R. (Michigan) [Discussant 10]

Patterson, H. (see Nicholson, P.) [29]

Patterson, Thomas (Temple) [Discussant 18]

Paulsen, Allison C. (Institute of Andean Studies-UC-Berkeley)

[73] PREHISTORIC ENVIRONMENTAL CHANGE IN SOUTHWEST COASTAL ECUADOR AND ITS EFFECTS ON LOCAL SETTLEMENT PATTERNS

The prehistoric ceramic sequence for the Santa Elena Peninsula, on the southwest tip of coastal Ecuador, consists of five successive and distinctive pottery styles which are, in order, Valdivia, Machalilla, Engoroy, Guangala and Libertad. Archaeological evidence suggests that this peninsular area was virtually unoccupied during three intervals, between Valdivia and Machalilla, between Guangala and Libertad, and from the end of Libertad until the Spanish arrival in 1532 A.D. This pattern of successive occupation and abandonment, which is not characteristic of the rest of the Ecuadorean coast, suggests that the peninsula was uninhabited whenever deterioration of the local environment did not permit human settlement.

Pearsall, Deborah M. (Missouri)

[73] INVESTIGATING PREHISTORIC SUBSISTENCE CHANGE AND AGRICULTURAL INTENSIFICATION IN THE JAMA RIVER VALLEY, MANABI, ECUADOR

This paper discusses on-going paleoethnobotanical and agronomic research documenting the nature of change in agricultural systems in prehistoric chiefdom-level societies in the Jama Valley. Results of two seasons of study of traditional corn and manioc cropping and growth conditions is presented. Archaeological data relevant to understanding prehistoric agriculture, including macroremain, phytolith, and pollen evidence from the Jama and San Isidro sites, are summarized. Changes in subsistence over time, and between sites of the upper (San Isidro) and lower (Jama) valley, are discussed in terms of the model of agricultural productivity.

Pearsall, D. M. (see Piperno, D.) [49]

Pendery, Steven R. (Boston City Archaeology Program)

[80] TRADE AND CONSUMPTION OF THE MASSACHUSETTS BAY PURITANS

The Massachusetts Bay Puritans are better known for their literary heritage than for their material culture. Yet, the Puritans propelled their colony into the mainstream of trade between Europe, Africa and the New World. This paper examines the earliest archaeological and documentary evidence for amenities in Massachusetts Bay households and argues for an active role of consumer goods in transforming social relations in both seaports and interior communities.

Penny, Jr., James S. (Southern Illinois-Carbondale)

[3] CULTURAL DEVELOPMENT IN MAINLAND SOUTHEAST ASIA: MODELS AND DATA

Models for prehistoric cultural development which have been applied to mainland Southeast Asia fit poorly with archaeological data now available. Models and data are reviewed with emphasis on the late prehistoric "Iron Age" in northeast Thailand. Theoretical assumptions underlying discussions of cultural development in Southeast Asia are examined and it is argued that present data negate some basic assumptions. Implications for regional studies and the importance of the Southeast Asian case in general theory are discussed.

Peraza, Carlos (CRY / INAH), George J. Bey III (Tulane) and William M. Ringle (Davidson)

[79] A COMPARATIVE ANALYSIS OF LATE CLASSIC CERAMIC COMPLEXES FROM THE NORTHERN MAYA LOWLANDS

Traditionally, the Late Classic/Terminal Classic Cehpech ceramic sphere (A.D. 700-1000) was perceived as a homogenous group of ceramic complexes found throughout the northern Maya lowlands. Recent research, however, has begun to alter this long-held perception. Western and eastern subdivisions of the Cehpech ceramic complex have been tentatively defined through detailed comparative ceramic analysis, and research at Sayil has defined early and late sub-phases. Ceramic data from a number of Late Classic Maya polities are examined that suggest the Cehpech ceramic sphere was composed of a number of varied regional complexes.

Peterkin, Gail Larsen (Tulane)

[21] SMALL STONE PROJECTILE POINTS IN THE FRENCH UPPER PALEOLITHIC

Several North American archaeologists have distinguished functional classes of projectile points (dart, arrow, and spear points) using attributes such as weight, neck width, and other metrical dimensions. These North American studies were compared to the results of a laboratory study of small chipped stone artifacts, all putative projectile points, from the Upper Perigordian and Upper Magdalenian assemblages of southwestern France. Fourteen continuous variables of the tip, edge, and haft were used in a series of discriminant function analyses; results indicate that edge angle is equally important in distinguishing classes of Upper Paleolithic projectile points.

Petersen, James B. (Maine-Farmington), Michael J. Heckenberger (Pittsburgh) and Louise A. Basa (New York Department of Environmental Conservation)

[19] LITHIC AND CERAMIC ARTIFACTS FROM THE BOUCHER CEMETERY: A SUMMARY OF INTERNAL AND EXTERNAL CORRELATIONS

Analyses of nonperishable lithic and ceramic artifacts from the Boucher site (VT-FR-26) demonstrate the inclusion of diverse burial goods in interments at this cemetery in northwestern Vermont. Predominantly utilitarian artifacts are included in this Early Woodland period assemblage, dated ca. 600-100 B.C. Intrasite correlation of the different artifact categories revealed distributions more likely attributable to episodic burial events than to differential status between interments. Correlation of these data with other samples from the Northeast further revealed distant relationships with contemporaneous Adena and Middlesex manifestations as well as earlier Terminal Archaic and later Middle Woodland period entities.

Petersen, J. B. (see Baker, T. R.) [77]

Petersen, J. B. (see Watters, D. R.) [52]

Petersen, J. B. (see Heckenberger, M. J.) [19]

Petraglia, Michael (Smithsonian)

[17] SPATIAL ANALYTIC TECHNIQUES AND SITE FORMATION PROCESSES AT THE ABRI DUFAURE, SOUTHWEST FRANCE

The role of various cultural and natural processes which lead to the formation of the archaeological record is examined. In order to better understand the complex processes that lead to intrasite distributions, a number of pattern recognition techniques must be employed. The resolution and integrity of the Dufaure deposits were examined with respect to material distributions (i.e., lithic debitage, tools, bone, cobble manuports, burned artifacts, eboulis), orientations, inclinations, lithic breakage, and lithic refitting. This approach has wide archaeological application, and may be of use to those who analyze the processes which form intrasite patterns.

Pfeiffer, John (SUNY-Albany)

[19] LATE ARCHAIC-EARLY WOODLAND IN SOUTHERN NEW ENGLAND: A CASE OF CULTURAL CONTINUITY

For the last decade evidence has been accumulated that indicates a prehistoric record of cultural continuity. Even though time changes and the periods proceed, the archaeological record may be documenting one people adapting to various cultural and environmental conditions. Such adaptational changes may be most manifested within the technological and economic subsystems towards which archaeology has an obvious bias. On the other hand, data from the social and ideologic subsystems may support cultural continuity. These theoretical issues are discussed and data are presented supporting a cultural continuity model.

Philpotts, A. R. (see Calagero, B. A.) [68]

Pickin, Frances R. (SUNY-Buffalo)

[71] HOLOGEISTIC ANALYSIS OF ARCHAEOLOGICAL DATA

A hologetic (cross-cultural) analysis of prehistoric data on three variables, often thought to reflect evolutionary patterns of growth, suggests that these variables are not as closely related as predicted by evolutionary theory. The close correspondence of population increases with changes in social complexity and artifact type heterogeneity is not supported. However, other patterns of evolutionary growth appear in these data.

Pierce, Christopher (Washington)

[13] FUNCTIONAL ANALYSIS OF FIRE-ALTERED ROCKS

When analyzed functionally, fire-altered rocks provide useful information on human adaptations and change. Function in fire-altered rocks can be documented by analysis of the rock's thermal properties and alteration patterns. Measures of thermal properties such as thermal diffusivity and inertia can be used to group fire-altered rocks into functional categories. These groupings are testable by observing physical and chemical alterations (fracture patterns, structural inversions, redox reactions, volatilization, etc.) caused by exposure of the rocks to different heating and cooling conditions. Analyses of fire-altered rocks in two collections from southern California reveal significant functional variability in both temporal and spatial dimensions.

Piggott, Vincent (MASCAPennsylvania)

[3] INVESTIGATING THE ORIGINS OF METAL USE IN PREHISTORIC THAILAND

The Thai Fine Arts Department - University Museum (University of Pennsylvania) jointly sponsored Thailand Archaeometallurgy Project (TAP) has recently completed its fifth season. Fieldwork has included archaeological site survey, excavation and geological reconnaissance in provinces of Northeast and Central Thailand. Its aim has been the systematic investigation of evidence for prehistoric mineral exploitation and metal production with the intent of elucidating the origins and development of metal use on a regional basis. Significant new information about prehistoric copper-base metallurgy as well as the associated settlements themselves will be discussed. The development of metal use in the Northeast and Central regions will be compared and contrasted in an effort to define "metallurgical provinces" in mainland Southeast Asia.

Piperno, Dolores (Smithsonian Tropical Research Institute) and Deborah M. Pearsall (Missouri)

[49] SOME COMMENTS ON THE ROLE OF PHYTOLITH ANALYSIS IN TROPICAL PALEOETHNOBOTANY AND PALEOECOLOGY

Phytolith analysis is now of sufficient maturity to provide an independent source of data in tropical paleoethnobotany and paleoecology. Phytolith specialists are also aware of areas where phytolith science cannot elucidate important issues and, through on-going studies of tropical plants and sediments, are discovering new applications. Through a review of our recent studies in the Old World and New World tropics, we present some contributions, problems, and prospects of phytolith analysis in informing the archaeological and botanical communities about such issues as: 1) the origins and dispersals of domesticated plants, 2) the nature of prehistoric modification of tropical forests, and 3) the distribution and composition of past plant communities.

Pohl, Mary (Florida State), Charles Miksicek (Arizona), J. Jefferson MacKinnon (Wisconsin) and Fred Wiseman (Johnson State)

[26] PRECLASSIC MAYA WETLAND FIELDS, ALBION ISLAND, NORTHERN BELIZE

Our analysis of abundant carbonized plant remains and pollen reveals that the Maya mainly planted corn on Preclassic wetland fields. Cotton and squash are other possible cultigens but we found no evidence for cacao or edible root crops. Radiocarbon dates on the remains indicate that wetland cultivation goes back at least to 1,000 B.C. and perhaps to the fourteenth century B.C. We assess models

of prehistoric wetland cultivation based on present day ethnographic accounts of farmers in Central and South America.

Polglase, Christopher (SUNY-Binghamton)

[34] COMPETING SOURCES, RESOURCE AVAILABILITY AND UTILIZATION AT THE END OF LONG-DISTANCE OBSIDIAN EXCHANGE ROUTES

Long-distance exchange of obsidian is a major aspect of economic relations during the neolithic in Italy. Comparisons of archaeologically recovered samples to geological source samples indicate the local availability and utilization of competing source materials. Two sites in northern Italy, Gaione (Parma) and Fornace Cappuccini (Faenza), are given as examples of intra-site variation in obsidian accessibility from different sources. Due to differential morphology upon arrival, different technological approaches are applied to the obsidian from the competing sources. These results suggest the problems faced by consumers of imported materials near the end of long-distance exchange networks.

Pollock, Susan (SUNY-Binghamton)

[18] WOMEN IN A MEN'S WORLD: IMAGES OF SUMERIAN WOMEN

Imagery and representation are important parts of any examination of power and prestige: our questions must address not only what people do, but also how their actions are socially recognized and valued. My paper examines gender relations in the early Sumerian civilization of Mesopotamia (mid-third millennium B.C.) through representations in different media. These media include texts, iconography, and burials. I consider the articulation of images with "actual" gender roles and relations, and evidence for dynamic aspects of gender relations.

Pool, Christopher A. (Tulane) and Robert S. Santley (New Mexico)

[29] MODELS OF MIDDLE CLASSIC POTTERY PRODUCTION AND DISTRIBUTION IN THE TUXTLA MOUNTAINS, SOUTHERN VERACRUZ, MEXICO

Economic systems of varying scale and character procure raw materials and distribute finished products in predictable ways, given a particular distribution of resources and level of demand. Evidence from geological field mapping, x-ray fluorescence spectrometry and archaeological survey and excavation are employed to develop alternative models of Middle Classic (A.D. 300-700) ceramic production and distribution in the southwestern Tuxtla Mountains of southern Veracruz. The models are evaluated in light of compositional data for pottery from other sites in the region and the geographical pattern of exploited clay source formations.

Pope, Geoffrey G. (Illinois)

[3] THE LOWER PALEOLITHIC OF SOUTHEAST ASIA: TOWARD THE DEVELOPMENT OF BIO-CULTURAL MODELS

A number of recent articles have suggested that the "amorphous" nature of Pleistocene paleolithic assemblages ("chopper-chopping tools") in the Far East may result from the minimal cultural capabilities of Pleistocene hominids, the absence of suitable raw materials or the isolation of this part of the world from other areas of Eurasia. Still other workers have suggested that true Acheulean assemblages (with a high percentage of hand-axes) do exist in the Far East and the relatively standardized typologies are discernable in the archaeological record. All of these interpretations suffer from serious shortcomings which cannot explain the totality of the evidence. An alternative interpretation is presented based on recent discoveries in China and Southeast Asia which indicate that the distinct nature of Far Eastern assemblages is a direct result of the exploitation of forest habitats accomplished through a reliance on a largely non-lithic technology that deemphasized the production and utilization of highly standardized lithic typologies. This interpretation is fully consistent with new paleoenvironmental, paleontologic and chronometric data suggesting that such an adaptational strategy persisted for over one million years throughout the Far East.

Pope, K. O. (see Dahlin, B. H.) [79]

Portnoy, Alice (Texas Tech)

[71] NEW AGE ARCHAEOLOGY

It is argued that "post-processual" archaeology (PPA) is part of contemporary society's "New Age" (NA) phenomenon. Both PPA and NA are in part responses to rapid change, information explosions, new technologies (sometimes poorly or misapplied), and failures of established philosophies and institutions to meet modern needs. PPA and NA participants seek to establish contact with the past in sometimes unorthodox ways, emphasize mental aspects of behavior, create plural "truths" and "realities," and attempt to unmask ideologies and their effects. The underlying assumptions and major manifestations of PPA and NA are examined and put into the context of contemporary society.

Possehl, Gregory L. (University Museum-Pennsylvania)

[10] REGIONALISM AND THE HARAPPAN CIVILIZATION

Recent research in the Harappan Civilization of India and Pakistan (2,600-2,000 B.C.) has revealed a complex cultural mosaic during the three major phases of this cultural tradition: Pre-urban, Urban, and Post-urban. The various regional manifestations of the Harappans seem to be dependent on ecological/adaptive features as well as cultural/stylistic elements. The monolithic construct stemming from the Wheeler/Piggott era is most certainly no longer a model suitable for productive scholarship.

Potter, D. (see King, E.) [46]

Powell, Mary Lucas (Kentucky)

[57] PALEOPATHOLOGY IN SOCIAL CONTEXT: HEALTH AND RANKED STATUS AT MOUNDVILLE

Modern paleopathological analyses must employ an explicitly integrative approach to evaluate accurately and interpret coherently the diverse array of factors influencing biological and social dimensions of health. Two decades of chronological, mortuary, settlement, and subsistence studies focused on the prehistoric Alabama chiefdom centered at Moundville. These data provided the background for a recent assessment of health in its social context. Bone strontium assay has indicated ranked associated dietary differences. Epidemiological analysis of skeletal data, however, revealed no clear pattern of differential health. These results, in turn, contribute to ongoing bone chemistry/isotopic and mortuary research.

Powell, Shirley (Northern Arizona)

[12] ARCHAEOLOGICAL SURVEY DATA: HOW CONSISTENT ARE WE IN RECORDING THEM?

Do archaeologists see the same things on survey, and how consistently do they record what they observe? Answers to these questions vary: management archaeologists often witness discrepancies in survey results, while academic archaeologists may perceive these questions as nonproblems. Parts of the Winona district, 35 kilometers east of Flagstaff, Arizona, have been surveyed up to three times by different archaeologists from different institutions using different standards and procedures. The results of these surveys are compared and contrasted with recent resurvey data to evaluate the effects of procedural variation and changing archaeological standards on survey data.

Power, Marjory (Vermont)

[19] THE ISLE LA MOTTE SITE: A REVISIONIST'S LOOK AT GLACIAL KAME

The Isle La Motte site in the Champlain Valley of northwestern Vermont is the single Glacial Kame cemetery known in New England. First reported in 1969, a reinvestigation was undertaken in response to the impending reinterment of skeletal remains and associated grave goods. The significance of the resulting data is discussed within the context of burial ceremonialism in Vermont and the Terminal Archaic-Early Woodland continuum; for a broader perspective, past assumptions and traditional hypotheses relevant to the Glacial Kame phenomenon are reevaluated.

Pozorski, S. (see Pozorski, T.) [28]

Pozorski, Thomas and Shelia Pozorski (Pan American)

[28] LATE PRECERAMIC SOCIOPOLITICAL ORGANIZATION IN THE CASMA VALLEY, PERU

Recent investigations at the Peruvian coastal site of Huaynuna revealed the presence of certain key elements of complex societal development during the late Cotton Preceramic Period (2,200-1,800 B.C.). These elements, which include corporate labor construction, technological sophistication, and social status differentiation, formed a partial foundation for subsequent sociopolitical development during the Initial Period (1,800-900 B.C.) and Early Horizon (900-200 B.C.). Components at Huaynuna dating to these later time periods can also be correlated with economic and political systems centered at major sites located within the Casma Valley.

Prater, Ariadne H. (UC-Berkeley)

[35] EARLY ART STYLES AT KAMINALJUYU

Stone sculpture represents one of the most significant artifact types found at Kaminaljuyu. Several distinct styles are reflected in the currently known corpus of stone sculpture from the site and suggest a long and complex history not clearly understood despite recent studies. Many of the sculptures exemplify sophisticated and well developed artistic skill and representations which must have foundation in the very early periods of prehistory although the antecedent evidence is minimal and confusing. This paper explores the question of antecedent styles and regional/indigenous artistic development.

Prezzano, Susan C. (SUNY-Binghamton) and Vincas P. Steponaitis (North Carolina)

[68] THE DEVELOPMENT OF LATE WOODLAND SETTLEMENT PATTERNS IN CENTRAL NEW YORK: NEW EVIDENCE FROM THE BOLAND SITE

Three seasons (1985-1987) of excavations at the Boland site in Broome County, New York have uncovered a Carpenter Brook phase (A.D. 1000-1100) occupation. The discovery of a single palisade line and at least two longhouses make Boland the only fortified multi-structure village of this early Owasco phase. The absence of superimposed house patterns as well as low artifact density indicate short-term occupation, a rare discovery for the Late Woodland stage. This aspect of the Boland site provides invaluable data on village composition and structure. The implications of these findings in relation to the generally accepted hypothesis of the development of Late Woodland settlement patterns are discussed.

Price, J. E. (see Lynott, M. J.) [52]

Price, T. D. (see Schoeninger, M. J.) [57]

Procter-Weiss, Rebecca (Washington-St. Louis)

[14] DESIGN STRUCTURE IN THE CERAMICS OF POT CREEK PUEBLO

The hypothesis that design structure is more amenable to objective study and is more reflective of pottery-painting groups than design "motifs" or "elements," which were more freely transferred across the prehistoric Southwest, is the basis of a research project in northern New Mexico. This hypothesis is being tested by examining painted pottery from Pot Creek Pueblo, a multi-story Anasazi structure (A.D. 980-1325). A classification is employed that utilizes categories denoting how design parts are laid out on a vessel to form a completed decoration. Emphasis is on reconstructing design structure from sherds, since few whole vessels are available.

Pulsipher, Lydia Mihelic (Tennessee)

[16] GEOGRAPHIC FIELD METHODS FOR ASSESSING LOCATIONS, TECHNIQUES, CROPS, AND THE IDEATIONAL ROLE OF SLAVE GARDENS IN THE CARIBBEAN

History indicates that beginning in the 17th century Afro-Caribbean people cultivated subsistence and cash crops to enhance their diet and to trade for cash or material items. Archaeology on Galways Plantation, Montserrat, WI, confirmed that such items were possessed by slaves. The following methods were used to assess the landscape evidence of this resource management strategy: geographic survey of relict agricultural land forms and irrigation efforts on plantation hinterlands, ethnography of the crops and techniques presently employed by traditional cultivators, and mapping of all folk place names (with folk explanations), noting especially those implying agriculture or related resource management.

Purser, Margaret (Sonoma State)

[54] TALES FROM THE BISHOP'S BODEGA: LATE COLONIAL CERAMICS FROM ANTIGUA, GUATEMALA

Excavated materials from the colonial capital of Antigua, Guatemala document Guatemalan participation in a rich, multi-national trade in Chinese and European ceramics. These assemblages also reveal a flourishing local industry stylistically distinct from those of neighboring Hispanic New World colonies. This rich body of data supports two major arguments. Archaeological data from later periods of Latin American history provide unique and significant information about European expansion in the New World, and the development of global market systems. This information both broadens and critiques what are often Anglo-dominated interpretations of expanding Western capitalism in the eighteenth and nineteenth centuries.

Pye, Mary E. and Arthur Demarest (Vanderbilt)

[35] THE EVOLUTION OF CIVILIZATION IN SOUTHEASTERN MESOAMERICA: NEW EVIDENCE FROM EL MESAK, GUATEMALA

Excavations during the second season at El Mesak in the Mar Azul estuary system of Pacific Coastal Guatemala made a number of surprising discoveries. These include evidence of the earliest ceramics, salt production, and public architecture yet discovered in Guatemala. The well-defined ceramic sequence, ecological data, economic evidence, and architecture indicate the gradual development of complex society in this region. By circa 900 B.C., El Mesak was part of a chiefdom participating fully in the "Olmec" symbolic system. This paper discusses this evidence and its implications for the nature and evolution of the Olmec civilization in eastern Mesoamerica.

Qoyawayma, A. (see Bishop, R. L.) [12]

Radisch, William H., Rodney J. Snedeker and Michael A. Harmon (USFS-North Carolina)
[27] TRENDS IN ARCHAIC MOBILITY AND SITE FUNCTION IN THE APPALACHIAN SUMMIT

Based on artifacts recovered from a sample of sites in the Pisgah and Nantahala National Forests, in North Carolina, it is illustrated how lithic raw material types, tool diversity and condition, and site location inform on models related to Archaic settlement mobility and site function. Models proposed for the Mountain and Piedmont regions are discussed and evaluated. These models are generally applied at an intra-regional scale of analysis, although similar social, temporal, and geographical trends have been observed which allow for meaningful comparisons at an inter-regional scale. An attempt is made to lower the "theoretical barrier," which seems to exist, between these two regions in order to open up avenues for inter-regional comparisons.

Rago Volk, Anna M. (Colorado)

[56] FORMATIVE VILLAGES IN SOUTHERN PACIFIC COSTA RICA: COMPARISONS WITH THE INTERMEDIATE AREA

Recent archaeological investigations in the Diquis region of southern Pacific Costa Rica indicate that small sedentary villages emerged ca. 500 B.C. on the higher terraces along major rivers. Surveys, test excavations of habitation sites, and evaluation of previous research suggest that the inhabitants of these villages developed strategies to exploit the great diversity of wild resources of the tropical forest. In contrast to western Panama's agricultural villages, seed-crop cultivation did not play a significant role in the economy, suggesting that divergent adaptations to the tropical forest existed during the Formative Period in the Intermediate Area.

Ramenofsky, Ann (Louisiana State)

[1] LOSS OF INNOCENCE: ASSESSING ARCHAEOLOGICAL EXPLANATIONS OF ABORIGINAL CHANGE IN THE SIXTEENTH-CENTURY SOUTHEAST

Archaeological perceptions of aboriginal societies in the sixteenth-century Southeast have varied according to prior assumptions of stability or instability. The assumption of stability facilitates the use of the direct historical approach or other analogical arguments to identify particular ethnic units or describe the structure of Southeastern societies. An assumption of instability allows archaeologists to identify and document probable sources of instability. Although instability is currently more popular, neither assumption is any closer to explaining aboriginal change in the sixteenth century. To do so requires theoretical constructs that can be evaluated against the archaeological record. Preliminary notions of this construction are considered.

Ramsey, John and Irwin Rovner (North Carolina State)

[49] PHYTOLITH EXTRACTION FROM EQUID TOOTH CEMENTUM

At the request of the Oriental Institute (Naples, Italy), wild ass teeth from a series of sites in Yemen were submitted for phytolith investigation. Technical improvements were developed to separately remove adhering soil and cementum without scraping, avoiding interference with potential surface wear data. Cementum samples yielded an abundance of plant biosilica in excellent condition. Several identifiable forms provide evidence of the dietary pattern—and by extension, environmental data. With appropriate sampling and comparison of data from several sites, this technique should provide a major source of significant data bearing on patterns of animal husbandry and pastoralism in the past.

Rapp, Jr., George (Minnesota) [Discussant 38]

Rapson, David (New Mexico) and Lawrence C. Todd (Boston)

[41] BODY SIZE, SEASON, SEX, AND BUTCHERY: INFERENCES ABOUT STORAGE AND TRANSPORT THROUGH FAUNAL ANALYSIS

Factors such as season, prey body size, and sex that influence hunter-gatherer decisions about hunting tactics, butchery techniques, transport choices, and storage practices can be investigated through analysis of archaeological faunal remains. Examination of a sample of bison (MNI=15) and bighorn sheep (MNI=14) from a hunter-gatherer occupation site in northwestern Wyoming focuses on documentation of interrelationships between body size, season of death, skeletal element counts, cut mark locations and frequencies, breakage, and distributional patterns. These data are used to infer two patterns of game animal use with bighorn sheep being killed during a restricted period and introduced and used as stored foods, while the bison were taken over a longer period of time and used on a more immediate basis.

Rattray, Evelyn C. (Instituto de Investigaciones Antropologicas)

[14] THE TEPEXI THIN ORANGE PROJECT

The Tepeji Archaeological Project has two major objectives 1) to discover the origins of the famous Mesoamerican archaeological ceramic, Thin Orange and 2) the experimental reproduction of the ceramic. A study of potters in the region who use similar clays and techniques has helped us to understand better the ancient potter's techniques and some of the commercial aspects involved in the production and distribution of the ware. Archaeological sites in the region are large with pyramids, ball courts, house compounds and sometimes 100 percent Thin Orange on the surface. Nearby are banks of exposed clay and deep beds of Acatlan schist, the two essential ingredients for making Thin Orange. Results of the first two seasons of field work are presented.

Rautman, Alison E. (Michigan)

[53] AGRICULTURAL RISK AND SUBSISTENCE STRATEGIES AT THE KITE SITE, CENTRAL NEW MEXICO

Resource procurement and mobility during the pithouse period of central New Mexico involved selection among alternate subsistence strategies that included variable combinations of hunting, collecting, and cultivating. Temporal and spatial variability in modern climatic data are used to develop a model that identifies loci of maximum resource reliability and postulates expected patterns of mobility and land use by part-time agriculturalists. Implications of the model are tested using excavated data from the Kite Site pithouse village (LA-38448).

Raxon, C. P. (see Swezey, W. R.) [56]

Redding, Richard W. (Cranbrook Institute of Science)

[71] SUBSISTENCE SECURITY AS A SELECTIVE PRESSURE FAVORING INCREASING CULTURAL COMPLEXITY

The evolution of cultural complexity after the appearance of food production must be seen as the result of the interaction of a number of pressures operating on the societies. The relative importance of the pressures undoubtedly varied temporally and spatially. However, a model based on the assumption that the most important selective force has been increased reliability of the subsistence base yields a number of interesting predictions. These predictions are examined and, while not formally tested, are compared with data from the Near East and North Africa.

Redmond, Brian G. (Glenn A. Black Laboratory-Indiana)

[76] POTS AND PANS: AN EXAMINATION OF CERAMIC VESSEL FUNCTION AND EARLY MAIZE SUBSISTENCE PRACTICES IN THE LOWER OHIO RIVER VALLEY

Beginning around A.D. 800 in the central and southern portions of the Eastern Woodlands, a conspicuous increase in the diversity of ceramic vessel forms appears to have co-occurred with the intensification of maize production. In the lower Ohio Valley, Emergent Mississippian ceramic assemblages dating to this period exhibit jar and bowl forms with widely varying morphological characteristics. During this same time period the first evidence of significant maize production appears. Data acquired from a recent analysis of Yankeetown Phase ceramics are used to examine the functional relationships between vessel form and subsistence for early maize-producing populations of this region.

Reents-Budet, Dorie (Duke) and Virginia Fields (UC-Santa Barbara)

[75] CLASSIC MAYA JADE AND SLATE ARTIFACTS FROM COSTA RICA

Thirty-five Early Classic Maya jade celts and slate mirror backs have been found in Costa Rican burials. These represent an incomplete assemblage of specialized artifacts closely associated with Maya elite status and ritual. All are incised with hieroglyphic texts and elite images that record historical events performed by royal individuals. The hieroglyphic texts and meanings of the objects among the Maya are discussed as are the socio-political processes by which they may have left Mayan hands. Also addressed are the socio-political implications of Costa Rican acquisition of elite Maya artifacts, and the trade routes suggested by the Costa Rican archaeological data.

Reher, Charles A. (Wyoming)

[32] PURSUING THE PAST TO FURTHER THE FUTURE: RESEARCH, EDUCATION, AND ECONOMIC DEVELOPMENT AT THE HIGH PLAINS ARCHAEOLOGY PROJECT

A multifaceted NSF/EPSCoR research endeavor in southeastern Wyoming has concluded the second of three field seasons and substantive results can be reported which relate numerous changes in occupational intensity (Paleoindian through Early Historic) to a theoretical framework emphasizing migration dynamics. Although centered at several stratified sites, the project has discovered and tested several Bison kill sites, rockshelters, defensive sites and burials reflecting prehistoric warfare, ceremonial rock alignments and trail markers, lithic tool caches, tipi ring sites, and historical sites.

Also of interest is a successful campaign to increase research funding by incorporating public education and local economic development at a large field lab/visitor center building complex.

Reher, C. A. (see Kornfeld, M.) [54]

Reid, J. Jefferson (Arizona)

[71] CRITICAL REFLECTIONS ON AMERICAN ARCHAEOLOGY 1963 - 1987

Twenty-five years of research at Grasshopper, Arizona, provide a unique case for critically examining the intellectual trends and socio-political conditions of American archaeology. Begun in 1963 along established lines of archaeological inquiry, Grasshopper research soon shifted to embrace the "new archaeology." Again in the mid-1970's, research was redirected through principles and procedures of behavioral archaeology. In addition, prominent social and political themes became embedded in the program. The forces of change are discussed as they reflect the dramatic, recent history of American archaeology.

Reid, Kenneth C. and James D. Gallison (Washington State)

[17] ARCHAEOLOGICAL DEPTH PERCEPTION IN TWO NORTH PACIFIC RAINFORESTS

Open sites in the insular and peninsular rainforests of northwestern North America are notoriously hard to find. Once found, they present more opportunities than usual for error in definition and interpretation. "Forest plowing" by gale felled trees, serial earth ball formation and deposition, and assemblage turnover are examined as processes contributing to vertical variability in prehistoric open sites, using examples from the Tongass and Olympic rainforests.

Reinburg, Kathleen (Foresight Science & Technology) [Discussant 33]

Reitz, Elizabeth J. (Georgia)

[15] TESTING THE DOCUMENTS: A CASE FROM NINETEENTH CENTURY CHARLESTON

The South has long been considered "The Kingdom of Pork." Documentary evidence indicates that a great deal of pork was being transported throughout the South. Travelers also reported consuming vast amounts of pork. However, the zooarchaeological evidence from Charleston indicates that diets in Charleston included more beef than pork, regardless of status. Explaining the differences requires considering limitations with both zooarchaeological and historical evidence. It appears that the notion that pork was the major meat of the antebellum south was not universally true and that historical evidence can be expanded by the archaeological record.

Reitz, Elizabeth J. (Georgia)

[44] ZOOARCHAEOLOGICAL EVIDENCE FOR SUBSISTENCE AT LA FLORIDA MISSIONS

Missions in La Florida were the primary focus of Spanish efforts to change Native American culture. Although food is an important aspect of culture and culture change, it is commonly overlooked in documentary accounts of colonization. Hence study of archaeological food remains from missions is an important source of information. Unfortunately, there are very few data from the missions of La Florida. Most of this review therefore concentrates on the zooarchaeological evidence from Santa Catalina de Guale. These data document that mission subsistence was substantially different from native or Spanish diets.

Reitz, E. J. (see Masucci, M.) [73]

Reitz, E. J. (see Scarry, C. M.) [22]

Renfrew, Colin (Cambridge)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Rensink, E. (see Roebroeks, W.) [24]

Reyman, Jonathan E. (Illinois State)

[58] WOMEN IN ARCHAEOLOGY: AN INTRODUCTION AND SOME HISTORICAL NOTES

Women have played an important role in American archaeology, although often their contributions have been overlooked and undervalued. An introduction to the symposium is given that highlights a few of these women and their contributions to our discipline.

Rice, Don S. (Virginia)

[6] DOMESTIC ARCHITECTURE AND SITE STRUCTURE AT EL YARAL, SOUTHERN PERU

The site of El Yaral consists of architectural terraces and structures which overlook the Moquegua River at approximately 1,000 meters above sea level in the Osmore drainage. The major construction episode at the site is radiocarbon dated between A.D. 1027±50 and A.D. 1252±50 (calibrated), and that occupation would appear to represent an extension of coastally-affiliated peoples in the upper valley

after the decline of Tiwanaku presence there. This paper reports the complete excavation of eight structures at El Yaral, describing both the architectural forms and cultural contents of the units. These data are the basis of speculation about the internal organization of the site, and comparisons between El Yaral and other Late Intermediate communities in the Osmore drainage.

Rice, Patricia (West Virginia)

[66] HUMAN IMAGES ON CAVE WALLS AND BONE: EMPIRICAL COMPARISONS

Relative to the number of animal images painted and engraved on cave walls and engraved on bone, human images are rare. Since cave walls and bone are different support media for art, it might be argued that the explanation of humans on cave walls is different from the explanation of humans on bone supports. Using an empirical and regional approach, human images on cave walls and bone are compared to animal images and archaeofaunal debris. The hypothesis is tested that the explanation of the human image in the European Upper Paleolithic is consistent for both cave walls and bone.

Rice, Prudence M. (Florida), Peter Burgi (Chicago), Mary Van Buren (Arizona) and Geoffrey W. Conrad (Indiana)

[6] TORATA ALTA, AN INKA-SPANISH SETTLEMENT

The site of Torata Alta is a small hilltop site with Inka and Spanish ceramics on the surface. Although the quality of stonework is rough, the architectural layout is well-preserved, the site being laid out in a grid with streets dividing it into 27 blocks. Much of the site appears to be residential in function, with possible social or functional differentiation suggested by characteristics of construction and ceramic frequencies. Limited excavations suggest a pre-1600 construction date and the possible presence of a church at the site.

Richards, J. R. (see Kealhofer, L.) [55]

Richardson, III, James B. (Carnegie Museum of Natural History), Jeffrey T. Hsu and Daniel H. Sandweiss (Cornell)

[28] ENVIRONMENTAL DYNAMICS AND THE INTERPRETATION OF PATTERNING IN PRECERAMIC REMAINS FROM SOUTH COASTAL PERU: UPLIFT AND SEA LEVEL

The coast of Peru south of Ilo (17 degrees south latitude) presents well-defined and extensive marine terraces at 20, 50, and 100 meters above mean sea level with associated preceramic sites, including a large midden site dated between 5,000 and 10,000 B.P. Interpretation of settlement logistics and subsistence patterns for these sites depends in part on identifying the dominant processes of rapid environmental alteration in the area. Although the condition of the terraces initially suggested rapid uplift, recent geochronologic and geomorphic studies indicate slow uplift rates and argue for post-glacial sea level rise as the dominant process affecting the Holocene landscape and preceramic human occupations.

Richardson, III, J. B. (see Moseley, M.) [50]

Richey, K. D. (see Cochran, D. R.) [64]

Rigaud, Jean-Philippe () [Discussant 17]

Riggs, Brett, Norman D. Jefferson and George M. Crothers (Tennessee)

[52] CONFLICT AND STRESS AT HIWASSEE OLD TOWN DURING THE AMERICAN REVOLUTION

During the late eighteenth century traditional Cherokee culture was severely disrupted by open conflict with Anglo Americans. Ethnohistoric accounts indicate that Hiwassee Old Town, a Cherokee village in southeastern Tennessee, played a principal role in this border warfare and was destroyed twice during the 1780's. Recent excavations at the town site have documented a substantial late eighteenth century Cherokee component. The archaeological manifestations of wartime social and economic stress at Hiwassee are examined through a comparison of contextual and assemblage patterning with that evident at nearby mid-eighteenth century Overhill Cherokee sites.

Ringle, W. M. (see Peraza, C.) [79]

Ringle, W. M. (see Bey III, G. J.) [11]

Rippeteau, Bruce, Steven Smith, Glen Hanson and Chris Amer (South Carolina Institute of Archaeology & Anthropology)

[63] THE 10-, 100-, AND 1000-YEAR FUTURE OF AMERICAN CRM: A SOUTH CAROLINA VIEW

The future of American CRM and archaeological knowledge are speculatively predicted, based upon the last 10 and 100 years of American archaeology and resource management theory and practice. Changing data bases, social tastes, national and world government, and human needs suggest to us certain important efforts (quantity of conserving, quality of analysis) and certain profound trivialities of our current CRM world. Particular emphasis is given to our joint experiences in a non-Federally-mandated but very large and central university and state government context.

Rivera, Mario A. (Chicago) [Discussant 6]

Roberts, Michael (Timelines, Inc.)

[38] ETHICS AND ARCHAEOLOGY FOR PROFIT

In recent years archaeologists have spent considerable time discussing the ethics of archaeology for profit. This paper explores the nature of archaeology and the ethical concerns raised by archaeologists and non-archaeologists alike. We will discuss various types of profit motive and the value of archaeological research as it relates to ethical issues. The paper is not designed to answer questions but to generate dialogue and will more than likely increase the number of questions to be answered.

Robertson, A. (see Siemens, A. H.) [73]

Robinson, Eugenia J. (CIRMA)

[35] MIDDLE PRECLASSIC POPULATIONS IN THE CENTRAL HIGHLANDS OF GUATEMALA

Middle Preclassic pottery with stylistic relations to Jocotal pottery has been found in the Central Highlands indicating the possible presence of early Middle Preclassic peoples near a riverine source. Extensive evidence of later Middle Preclassic populations, some at sites located in the defensible locations typical of late Proto-historical forts, indicates that Middle Preclassic populations occupied not just the alluvial flat lands as had been previously thought, but may have controlled territories from difficult-to-access points near mountain water sources.

Robinson, E. J. (see Swezey, W. R.) [56]

Robinson, Renee A., Margaret J. Schoeninger and Matthew L. Murray (Harvard)

[67] THE TALE THE PINE TREES KNEW: STABLE ISOTOPE ANALYSIS OF EUROPEAN PLANTS

In the stable isotope analysis of paleodiet it is necessary to know the isotopic signatures of the potential dietary components. As part of a chemical study of the diet and social organization of an Iron Age community in Central Europe, the isotopic composition of a selection of important domesticated and wild plant foods was determined. The results are unique for Central Europe, and establish a base of reference for future isotopic studies. The stable carbon results also indicate a significant separation of domesticated and wild plants (about 1 o/oo); this separation suggests that stable carbon isotope ratios may be used to test the relative amounts of wild and domesticated plant foods in the prehistoric diet.

Robinson, Stephen W. (U.S. Geological Survey)

[39] THE PROBABILISTIC CALIBRATION OF RADIOCARBON AGES

Imperfect knowledge of the relationship between radiocarbon ages and the calendric time scale has limited the application of radiocarbon dating to archaeology, particularly when concurrent historical data were available. Largely through the efforts of the Seattle and Belfast laboratories there has appeared in recent years a well-replicated, high-precision calibration curve based on dendrochronologically dated wood. The curve covers the last 9,150 years, with a radiocarbon precision of ± 15 to ± 20 years. The use of this curve is complicated by the many oscillations which cause the calendric age to be a multivalued function of radiocarbon age. To effectively use the calibration curve it is necessary to include the effects of the measurement errors of the radiocarbon date and the calibration curve itself, as well as to deal with the multivalued character of the curve in a statistically meaningful manner. The primary result of the calibration, which is implemented on a microcomputer, is a probability distribution on the calendric time axis that allows derivation of the expectation value associated error, and a variety of probability ranges (confidence limits).

Rocek, Thomas (Delaware)

[12] SAMPLE SIZE AND SEASONALITY: COMPARISONS OF ARTIFACT ASSEMBLAGE COMPOSITION

Sample size variation is a ubiquitous, but often ignored factor influencing inter-assemblage variability. Since sample size often correlates with other factors (e.g., site function, chronology), sample

size variation may confound multiple sources of inter-assemblage variability. Several approaches to correcting for sample size differences are explored: 1) inter-assemblage pooling of counts to create large samples, 2) sub-sampling of assemblages to equalize sample sizes, and 3) simulated derivation of sample size dependent frequency distributions. These methods are compared in the analysis of seasonal artifact assemblages from 49 historic Navajo sites on Black Mesa, Arizona.

Roebroeks, Wil, Jan Kolen and Eelco Rensink (Leiden)

[24] INTERASSEMBLAGE VARIABILITY IN THE MIDDLE PALEOLITHIC: THE RAW MATERIAL EVIDENCE

The problem of interassemblage variability is attacked from a "behavioral" rather than a typological point of view. Focusing on the organization and procurement of technology and raw materials at a regional scale, the "Mousterian problem" is interpreted as being the consequence of two basic strategies: local manufacture or transport of stone artifacts. The heuristical value of this explanation is demonstrated with data from the European Middle Paleolithic.

Rogers, J. Daniel (Smithsonian)

[36] DISPERSED COMMUNITIES AND INTEGRATED HOUSEHOLDS: A PERSPECTIVE FROM SPIRO AND THE ARKANSAS BASIN

The changing nature of households and coresidential groups in the Spiro region is explored by examining chronological variation in the dwelling shape and size and functional implications derived from associated artifact assemblages. The growth and arrangement of the "extended community" in the immediate Spiro area, from the Harlan Phase (A.D. 850-1250) to the Spiro Phase (A.D. 1250-1450), reveals organizational changes interpreted as being associated with the decreasing role played by "family level" social mechanisms and the expanding role of supra-local forms of control and integration.

Rogge, A. E., Patrick M. O'Brien and Everett J. Bassett (Dames and Moore)

[45] GOING DOWN THAT LONG LONESOME CORRIDOR

Projects such as highways, pipelines, transmission lines, and, more recently, fiber optic cables often create long, narrow study areas that seem totally arbitrary from a normal research perspective. The results of regulatory studies for such corridors often amount to little bits of information about a lot of unconnected pieces. Although such data contribute to regional data bases, they are often unsatisfying in terms of immediate research results. Case studies are used to illustrate how the limitations of corridor studies can sometimes be overcome through 1) regional siting studies (that can be GIS assisted), 2) focusing on appropriately scaled research questions, and 3) regulatory flexibility that encourages trade-offs.

Rolett, Barry (Hawaii)

[43] THE POLYNESIAN ANALOGY TO PLEISTOCENE FAUNAL EXTINCTIONS: NEW EVIDENCE FROM THE MARQUESAS ISLANDS

Numerous studies document the extinction of Polynesian land birds following human settlement of previously uninhabited islands. The pattern of Polynesian bird extinctions has been discussed as an analogy to continental faunal extinctions during the late Pleistocene. New evidence from excavation of a stratified coastal habitation site on Tahuata, in the Marquesas Islands, allows refinement of this analogy. The Marquesan data provide the first well-dated sequence of land and sea bird extinctions recorded in cultural context for the tropical Pacific. Implications of these data and evidence from other Polynesian islands are discussed in light of the Pleistocene faunal overkill hypothesis.

Rolland, Nicholas (Victoria) and Harold L. Dibble (Pennsylvania)

[24] MIDDLE PALEOLITHIC ASSEMBLAGE VARIABILITY: A SYNTHESIS OF CURRENT ARGUMENTS

The classic debate on Mousterian assemblage variability originally focused on two principal factors that were thought to underlie lithic variability: style and function. Recent studies, however, have demonstrated that many significant constraints on lithic variability are imposed by aspects of raw material, technology, and even post-depositional factors. Thus, it is becoming increasingly clear that no single explanation is sufficient to account for observed variation in the industries. Based on evidence from the Upper Pleistocene of Western Eurasia, we propose here a new synthesis of the various factors that appear to work together to produce typological variability as it is currently measured and discuss implications for the understanding of hominid behavior during this time.

Rollefson, G. (see Kafafi, Z.) [81]

Roper, Donna C. (*Commonwealth Cultural Resources Group*)

[32] ECONOMIC CHANGE IN THE VILLAGE PERIOD ON THE CENTRAL PLAINS

The dual economy of the historic Central Plains villagers is traditionally thought to post-date the introduction of the horse; little economic change is assumed for much of the prior millennium. Subsistence and settlement data, however, reflect fundamental change earlier. Indicated is a shift from diverse to restricted catchments, generalized to specialized diets, population dispersal to aggregation, and a logistical settlement strategy to a sharply differentiated economy with village residence part of the year and residential mobility during the remaining months. This shift largely was complete in proto-historic times, before acquisition of the horse.

Rossen, Jack (*Kentucky*)

[28] THE NANCHOC CULTURE: PRECERAMIC HORTICULTURALISTS OF THE UPPER ZANA VALLEY, NORTHERN PERU

In 1987, as part of the long-term Zaña-Niepos Archaeological Project, excavations were conducted at a series of early Middle Preceramic sites in the Quebrada de Las Pircas, in the Nanchoc branch of the upper Zaña Valley. These excavations yielded the remains of houses, burials and activity areas within intact subsurface deposits, preliminarily dated at 7-8,000 B.P. Various lines of evidence suggest a semi-sedentary to sedentary horticultural lifestyle. The distinctive nature of this western slope Preceramic culture and its contribution to the foundations of complex Andean society are discussed.

Roth, Barbara (*Arizona*)

[61] CHANGING PERCEPTIONS OF THE LATE ARCHAIC: AN EXAMPLE OF THE TUCSON BASIN

Research on the Late Archaic in the southern Sonoran Desert has resulted in substantial new data for interpreting Late Archaic adaptations. Recent excavations have documented agricultural villages along major waterways by 2,500 B.P. Changing interpretations of the Late Archaic are examined using data from the Tucson Basin Survey. A shift to more intensive use of the floodplain owing to the adoption of agriculture is discussed, and the mechanisms responsible for these changes are analyzed. Conclusions are offered concerning implications these shifts have for understanding ceramic period developments in the Sonoran Desert.

Rovner, Irwin (*North Carolina State*)

[49] NEW METHODS OF MICROSCOPIC IMAGING AND RAPID IMAGE ANALYSIS OF CHAOTIC MICROPARTICLE MORPHOLOGY

Two new methods of microscopy—acoustic and laser optical—provide better, more efficient rapid imaging of phytolith assemblages either *in vivo* or with minimal preparation. The same image can be used for recording, measuring and analyzing both articulated groups and individual particles (disarticulated assemblages). Output can be sent directly to a computer-based image analysis system for automatic and interactive stereological analysis. Both methods yield a vertical sequence of stacked images for reconstruction and analysis of three-dimensional morphology. These new technologies regularize large populations of particles with wide morphological variation as occurs in phytolith assemblages and other microfossil systems.

Rovner, I. (see Ramsey, J.) [49]

Rowley-Conwy, Peter (*Memorial- Newfoundland*)

[9] THE DANISH-SOUTH SWEDISH COASTAL REGION IN THE FOURTH MILLENNIUM B.C.

The rise in sea level in the early fourth millennium B.C. brought many new marine resources to the Danish-South Swedish area. Various local economic systems emerged due to local ecological variations. The successful nature of these marine-based economies was one reason why farming appeared relatively late. Environmental changes may have been the reason why agriculture finally spread into southern Scandinavia at the end of the fourth millennium B.C., after a long period of contact between the hunter-gatherers and farming cultures to the south.

Rudolph, James L. (*URS Consultants*)

[37] OVEREXPLOITATION AND SIZE SELECTION AS EXPLANATIONS OF VALVE LENGTH IN MYTILUS CALIFORNIANUS

The abundance of very small mussels (*Mytilus californianus*) at sites in northern Santa Barbara County, California has been attributed to overexploitation. However, recent research suggests that size selection by sea otters and humans may also have been important. The length of mussels from a Middle period shell midden averaged 4.4 cm and many individuals were too small to have reached reproductive maturity. Sea otters have been known to avoid mussels of this size or smaller. Also, in cases of low

intensity exploitation by humans, the energy to dislodge mussels might have favored the selection of smaller individuals.

Rudolph, Teresa (*UC-Santa Barbara*)

[52] A TRIBAL CEREMONIAL CENTER IN REGIONAL CONTEXT

Tribal ceremonial centers have been linked to long distance exchange networks, surplus horticultural products, and redistribution of subsistence goods during times of scarcity. In all of these explanations, the function of the center needs to be examined within its regional context. The regional settlement patterns and the changing occupation at a ceremonial center in central Georgia are examined from A.D. 100 to A.D. 700 to address questions of resource scarcity and abundance. The analysis focuses on site locations in relation to abundance and diversity of resources, risk of resource failure, and use of domesticated plants.

Rue, David J. (*WAPORA, Inc.*)

[45] INTERSITE ANALYSIS OF 20 LITHIC ASSEMBLAGES FROM A 140 MILE PIPELINE CORRIDOR IN SOUTHERN INDIANA

The majority of sites discovered in southern Indiana by a pipeline survey are found to be short term occupation, resource procurement camps with minimal habitation, based on extensive testing. An intersite study of the lithic assemblages of twenty sites is presented utilizing the statistical technique of cluster analysis. The cluster analysis, using broad categories of debitage stages and tools, yielded behavioral and chronological site characterizations. Beyond raw material sourcing and determining chronology through diagnostic analyses, analysis of the ratios of different artifact classes (including reduction stages) is the most important source of information on site function to be obtained from such sites.

Ruff, Barbara (*Georgia*)

[15] FAUNAL REMAINS FROM A JEWISH HOUSEHOLD, OLD WASHINGTON, ARKANSAS

Vertebrate fauna from an antebellum urban farmstead in Old Washington, Arkansas were studied. The materials are associated with a prominent merchant family which was Jewish. Analysis of the fauna reveals a pattern of subsistence that emphasized domestic animals, including pork. A wide variety of wild mammals, birds, and fish were also found. In many respects this pattern conforms to urban subsistence data from comparable sites of the southern Atlantic coastal plain rather than conforming to kosher rules. This suggests that economic and environmental factors may have influenced the household's subsistence choices within a religious framework.

Rufo, Ann (*Hospital of the University of Pennsylvania*) and William Glanzman (*MASCA-Pennsylvania*)

[39] NOVEL APPLICATIONS OF X-RAY TECHNOLOGIES IN ARCHAEOLOGY

A review of past applications of x-radiography to Egyptian and Peruvian mummies, Japanese wooden sculpture, Chinese Bronzes, etc., will be followed by a discussion of how the latest advances in x-ray technology—CAT scanning, digital image enhancement, and xeroradiography—also have appreciable potential in archaeology. The use of xeroradiography in the study of pottery manufacturing methods will be described in detail, drawing on examples from Neolithic Iran, Bronze Age Syro-Palestine, and pre-conquest Peru.

Rufo, A. (see Glanzman, W.) [3]

Ruhl, Donna (*Florida Museum of Natural History*)

[44] SPANISH MISSION PALEOETHNOBOTANY: AN OVERVIEW AND SOME SPECULATIONS ON SIXTEENTH AND SEVENTEENTH CENTURY LA FLORIDA

Analyses of floral remains from sixteenth and seventeenth century Spanish mission sites of *La Florida* have been concerned primarily with gleaned information about subsistence systems (i.e., plants used as food), which is the traditional method of inquiry and information sought from the generated archaeobotanical data. Recent research has provided data on non-subsistence plant utilization (e.g., architectural and ecclesiastical uses) as well as broadening our understanding of Mission subsistence and social organization providing insights into Frontier settlements and lifeways, culture contact, and acculturation studies.

Russell, K. F. (see Larsen, C.) [44]

Rust, William F. (*Pennsylvania*)

[69] OLMEC SETTLEMENT EVIDENCE FROM LA VENTA

Recent settlement research at La Venta, a major Olmec center on the Mexican Gulf Coast, reveals evidence of initial occupation during the Early Preclassic period (ca. 1,750-1,150 B.C.) along levees of

the silted-in Rio Bari north of the site core, in an environment changing from estuarine to riverine. Lowlands surrounding La Venta, previously thought to have been swampy and virtually uninhabited during La Venta's main occupation, instead contained numerous villages along this newly-discovered riverine focus. During its peak period as a civic-ceremonial center (ca. 800-500 B.C.), La Venta itself contained dense areas of domestic settlement and headed a local three-tiered site hierarchy with social distinctions extending to peripheral Rio Bari sites.

Sabloff, Jeremy A. (Pittsburgh)

[23] WHERE TO FROM HERE? THE ROLE OF THE PROFESSION IN THE LOOTING PROBLEM

Looting and vandalism is a major crisis that the archaeological profession cannot ignore. To address this critical problem, we must first understand the extent and effect of looting of sites, the motives of looters and vandals themselves, and public perceptions of the issue. Second, we must help prevent the problem by working to share the results of research, to educate the public about the importance of archaeology, and to change public attitudes. Third, we must help combat the problems through working for better law enforcement, better legislation, and more funding and better training for those who deal with this issue.

Sabloff, Jeremy A. (Pittsburgh)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Sackett, James (UCLA)

[24] STONE TOOLS AND MOUSTERIAN "PROTOCOLTURE": A DISSENTING VIEW

Much of today's best empirical research on the dynamics of stone tool variation is being pursued by Mousterian specialists. However, the theoretical implications some draw from their work are often grounded upon assumptions and expectations of questionable validity. The argument that Middle Paleolithic industries reflect symbolic behavior different in kind and degree from that seen in Upper Paleolithic ones is critically examined. Despite what other realms of artifactual evidence might suggest, the lithics themselves fail to support the notion that the Mousterian represents a stage of "protoculture" somehow less fully human than the Upper Paleolithic lifeway that followed it.

Salgado, Silvia (SUNY-Albany)

[62] FUNERARY PATTERNS OF THE MIDDLE POLYCHROME PERIOD IN THE SOUTHERN SECTOR OF GRAN NICOYA

The funerary patterns of the Greater Nicoya archaeological region (Nicaragua and Costa Rica) are poorly known. Mortuary information for the Middle Polychrome period (A.D. 800-1200) includes data on habitation sites and cemeteries. Regularities in mortuary behavior during the Middle Polychrome period are discussed. Ethnographic data are used to help characterize the period.

Salzer, Robert (Beloit)

[60] MISSISSIPPIAN WARFARE: ARCHAEOLOGY, ORAL HISTORY AND ROCK ART IN THE UPPER MIDWEST

Employing the results of research in a wide variety of approaches to the past, it is possible to gain new insights into the variety of institutionalized patterns of inter-group conflict that characterize the Mississippian period. Data indicate that aggression was motivated by a range of mechanisms that articulated with multiple aspects of the lives of the peoples of the upper Midwest. Oral traditions and rock art are shown to add surprisingly rich dimensions to the archaeological record.

Sanders, William T. () and David L. Webster (Pennsylvania State)

[57] THE CONJUNCTIVE APPROACH REVISITED: THE ARCHAEOLOGY OF COPAN IN THE 1980'S

A paradox has emerged in archaeology over the past 30 years. Because of the continuing association between ethnographers and archaeologists as well as the technological development in archaeological methods and their linkage with other sciences, detailed reconstructions of ancient cultures are now possible. This requires an unusually rich data base because of the twin problems of cost and sampling. We must focus on relatively small regions, apply long-term commitments of funds and personnel, and employ methods from different fields of science. Research conducted at Copan, Honduras, including several related projects between 1974-1988, are discussed with respect to the above points.

Sandweiss, Daniel H. (Cornell)

[15] ETHNOHISTORIC AND ARCHAEOLOGICAL REWARDS FOR THE FISHERMEN OF CHINCHA, PERU

Archaeological investigations of a Chincha fishing settlement—including analysis of the faunal remains—provides partial support for a model of community specialization based on a sixteenth

century document. The presence or absence of species and relative abundance of skeletal elements by species show a preponderance of maritime (versus terrestrial) animals in the meat diet of the site's inhabitants. The frequency data for skeletal elements of fish suggest that fish were processed at the site, probably for exchange. The faunal data also support the differentiation of elite and common sectors of the settlement initially based on architectural and documentary data.

Sandweiss, D. H. (see Richardson, III, J. B.) [28]

Sanger, David (Maine)

[7] WHERE DID THE INDIANS GO? SEASONALITY ISSUES ON THE MAINE COAST

During the past two decades models of seasonality on the Maine coast have fluctuated as scholars first placed heavy reliance on ethnographic sources and then eschewed them almost completely. The revisionist literature has stemmed from ever more sophisticated seasonality estimates derived from shell midden sites. Following a review of some of the major seasonality models, the data and assumptions of each can be evaluated critically. The paper concludes with an examination of the most effective way to integrate various data sets, including ethnohistorical sources, biological indicators, style analysis, and settlement pattern information.

Santini, Geraldina (IsMEO)

[72] SOCIAL EVOLUTION IN EASTERN ARABIA ACCORDING TO BURIAL DATA

Since 1978 archaeological fieldwork has disclosed throughout the Oman peninsula the first systematic evidence for the trends of Arabian social evolution during the Holocene. While the archaeological record for settlement sites is quite inconspicuous, graves are abundant and easy to access. The distribution of cairns provides information on population distribution and locational strategies. Excavation of a first sample points to an increasing trend around 3,000 B.C. toward group burial, suggesting lineage groups that foreshadow Arabian tribalism.

Santley, Robert S. (New Mexico)

[46] URBAN-RURAL INTERRELATIONSHIPS AT MATACAPAN, VERACRUZ, MEXICO

Cities are often defined as large, densely nucleated communities occupied by specialists who provide a variety of goods and services to rural populations distributed around them. The utility of this definition is evaluated on the basis of recent research in the Tuxtla Mountains of southern Veracruz, Mexico. The large-scale population nucleation that took place at Matacapan, the major center in the area, appears to have occurred mainly in response to political factors, whereas the development of a specialized craft economy seems to have occurred for a number of reasons, some political and others economic. Moreover, most specialized craft production was in the countryside, not in the principal central place, indicating that conventional definitions of urbanization require reconsideration.

Santley, Robert S. (New Mexico) [Discussant 29]

Santley, R. S. (see Pool, C. A.) [29]

Saunders, Rebecca (Florida Museum of Natural History)

[44] IDEAL AND INNOVATION: SPANISH MISSION ARCHITECTURE IN THE SOUTHEAST

The Spanish in general, and missionaries in particular, brought to the New World concepts of ideal settlements—without the labor or materials to construct them. Ideologically alone in the wilderness of the Spanish borderlands, one or two missionaries faced the problems of building an ideal using unfamiliar materials and a sometimes reluctant work force. The sheer size of the territory the Spanish tried to settle, and the diversity of the environments and the peoples they tried to control, demanded innovative approaches. Unique architectural characteristics of each mission represent the solution of a few individuals in adapting an ideal configuration to the real natural and cultural ecology of the specific area and people.

Savelle, James M. (McGill) and Don Albright (Macdonald College-McGill)

[30] COMPARISON OF PREPARATION AND EXAMINATION TECHNIQUES IN DENTAL ANNULI ANALYSIS

The potential of dental annuli in establishing the season at death of many mammalian species recovered in archaeological contexts is widely recognized. However, tooth preparation and examination techniques have varied considerably, and rarely are results "keyed" to modern specimens using identical techniques. Preparation techniques include polishing, thin-sectioning, and staining with various dyes. Examination techniques include reflected light, transmitted white light, and transmitted polarized light. Accordingly, individual published studies are often difficult to compare or are inconsistent. These preparation and examination techniques are compared on a variety of marine and terrestrial mammals of known date of death.

Savelle, J. M. (see McCartney, A. P.) [43]

Scarry, C. Margaret (Florida State) and Elizabeth J. Reitz (Georgia)

[22] HERBS, FISH, SCUM, AND VERMIN: SUBSISTENCE STRATEGIES IN SIXTEENTH CENTURY SPANISH FLORIDA

The establishment of St. Augustine and Santa Elena initiated changes in the foodways of both the Spanish colonists and the Native Americans. Analyses of subsistence remains provide insights about changes in the procurement and production of plant and animal foods. The new subsistence strategies relied heavily on New World resources but incorporated some Old World domesticates. Variations on the basic dietary pattern are associated with differences in ethnic affiliation and socioeconomic status. Discrepancies between the archaeological and documentary records suggest that food use changed more readily than food preferences.

Scarry, John F. (Florida Bureau of Archaeological Research)

[1] BEYOND APALACHEE PROVINCE: ASSESSING THE EVIDENCE FOR EARLY EUROPEAN-INDIAN CONTACT IN NORTHWEST FLORIDA

The Chotawhatchee Bay area of northwest Florida received little mention in early Spanish accounts, and was largely ignored by seventeenth-century settlers and missionaries. Nevertheless, it has yielded abundant evidence of sixteenth-century contact between Europeans and Indians. The archaeological and ethnohistorical evidence for this contact is reviewed, and sources of the European materials are discussed. Several possible explanations (e.g., massive post-contact depopulation of the area, the absence of abundant food supplies and agricultural lands, and the political organization of the native groups) are offered for the failure of the Spanish to follow up on the early contacts in the area.

Scarry, John F. (Florida Bureau of Archaeological Research)

[36] APALACHEE HOUSEHOLDS: EXAMINING THE BASAL SOCIAL ECONOMIC UNITS OF A MISSISSIPPIAN SOCIETY

Ethnohistorical and archaeological data are used to develop a picture of lower level Apalachee political and economic organization. The minimal residential unit, the individual household, formed the base of Apalachee society. These units are described. Their relationships to higher-order, larger-scale political and economic units within the Apalachee chiefdom are explored through examinations of the spatial organization of farmsteads, archaeological and ethnohistorical settlement pattern data, and ethnohistoric accounts of Apalachee economic and political organization.

Scarry, J. F. (see Marrinan, R. A.) [1]

Scarry, J. F. (see Smith, Jr., M. F.) [52]

Schalk, Randall and Richard L. Taylor (Center for Northwest Anthropology-Washington State)

[70] REGIONAL LAND USE IN THE CASCADE MOUNTAINS, WASHINGTON: CHANGING STRATEGIES THROUGH THE HOLOCENE

A model of regional land-use is proposed for Holocene adaptations to the Cascade Mountains and adjacent lowlands. Early to mid-Holocene adaptations are seen as mountain-focused with seasonal use of resources by logistically organized hunter-gatherers. A dramatic shift in regional land-use occurs with the exploitation of salmon as a storable resource, with the focus of the adaptation shifting to the maritime lowlands. Foothill and mountain resources continue to be used by specialized task groups who range out from lowland residential locations. This model is evaluated with data from recent projects conducted in the region.

Schele, L. (see Freidel, D.) [11]

Schiffer, Michael B. (Arizona)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Schlanger, Sarah (Louisville)

[12] RECOVERY CONTEXTS AND SYSTEMIC FUNCTION OF GROUND STONE ARTIFACTS IN ANASAZI SETTLEMENT SYSTEMS

Horticultural systems such as the prehistoric Anasazi culture of the American Southwest used simple tools to carry out complexly organized tasks. The most durable elements of the Anasazi toolkit were ground stone implements. The systemic functions of these artifacts are examined through a consideration of different recovery contexts in which ground stone occurs, including architectural units, activity areas, and nonsite settings. It also presents a model for an extensive ground stone technology where durable artifacts participate in different aspects of a settlement system as tools become worn and are recycled to new tasks or new locations.

Schmitt, Dave N. (Intermountain Research) and Kenneth E. Juell (New Mexico)

[43] ON THE IDENTIFICATION OF CARNIVORE SCATOLOGICAL FAUNAL ACCUMULATIONS IN ARCHAEOLOGICAL CONTEXTS

One of the most important, and at the same time most difficult, tasks in zooarchaeological inquiry is the differentiation between human and non-human processes responsible for fossil accumulations. While recognition of some accumulative mechanisms remain indiscernible due to our taphonomic naivete, detailed observations on bones in carnivore feces indicate that most become corrosively modified by digestive processes. Diagnostic attrition is evident in polish, particularly along fractured surfaces, pitting, and differential staining. In addition to taxonomic identification, bone fragment size and skeletal completeness may be applied to understanding typical scatological constituents. Taphonomic implications for understanding prehistoric (human) deposits are discussed with specific reference to scat bones from Great Basin archaeological sites.

Schneider, Fred (North Dakota) and Michael Michlovic (Moorhead State)

[32] THE SHEA SITE AND THE PROCESS OF PLAINS-WOODLAND INTERACTION

Archaeological investigations of the Shea site, located in southeastern North Dakota, has revealed a complex cultural assemblage that does not fit into either a Plains Village pattern or a Late Woodland pattern. The site was occupied during the mid-15th century and may reflect a people in the process of adaptation to a Plains Village life-way. The Shea site indicates that the development of village living was widespread on the Plains, and it raises taxonomic as well as processual questions about standard conceptions of Plains villagers.

Schneider, Kent A. (USFS-Atlanta) and M. R. Beckes (USFS-Milwaukee)

[63] REINTERMENT IN THE REAL WORLD: MAKING IT WORK

In January, 1988, the Southern and Eastern Regions of the USDA Forest Service signed a policy for the treatment of human remains and associated grave goods. The policy, which favors reinterment, requires each administrative unit of these two regions to form an ad hoc group and write a treatment action plan. This paper focuses on the development of these action plans, which were completed in January, 1989, and what the plans mean for managing human remains and associated grave goods on National Forest Land.

Schneider, K. A. (see Meier, M. C.) [27]

Schneider, K. N. (see Blakeslee, D. J.) [32]

Schoen, C. (see Bleed, P.) [54]

Schoeninger, Margaret J. (Harvard) and T. Douglas Price (Wisconsin)

[57] BONE COMPOSITION STUDIES IN ARCHAEOLOGY

Bone composition methods including both stable isotope ($^{13}\text{C}/^{12}\text{C}$ and $^{15}\text{N}/^{14}\text{N}$) and trace element (Sr, Zn, Ba, Mn, etc.) studies originated in Geochemistry. Applying these methods derived from simple mathematical and chemical models to "messy" biological systems has been more complicated (although far more interesting) than expected originally. Use of stable isotope ratios of carbon and nitrogen in bone collagen to indicate dependence on marine foods has led to a reevaluation of our understanding of human metabolism. Multiple studies analyzing trace element composition in prehistoric populations indicate that their levels may reveal more about the diagenetic history of the bone than diet of the person when alive.

Schoeninger, M. J. (see Larsen, C.) [44]

Schoeninger, M. J. (see Levendosky, A. A.) [32]

Schoeninger, M. J. (see Robinson, R. A.) [67]

Schoeninger, M. J. (see Medaglia, C.) [67]

Schortman, Edward M. and Patricia A. Urban (Kenyon)

[79] CRAFTWORKING AREAS AND THE DEVELOPMENT AND MAINTENANCE OF SOCIAL COMPLEXITY IN A LATE CLASSIC SOUTHEASTERN MESOAMERICAN POLITY

Work at the large Late Classic Center of La Sierra and the region's smaller contemporaneous sites reveals that craftworking is almost entirely restricted to La Sierra, where non-local (obsidian, marine shell) and local (clay, fiber) materials were processed. Other sites show little craftwork, and none used exotic items. Many finishing products, regardless of material type, have circumscribed distributions. This contrasts with other southeastern Mesoamerican regions suggesting that manufacturing and

distribution played varying roles in developing and maintaining social complexity. These differing models will be discussed.

Schortman, E. M. (see Miller, J.) [56]

Schreiber, Katharina J. (UC-Santa Barbara)

[42] NASCA HABITATION SITES: WHERE THEY ARE AND WHAT THEY LOOK LIKE

One of the great mysteries of the enigmatic Nasca civilization [A.D. 100-600] is the apparent lack of habitation sites. This is primarily the result of biases in past archaeological research, not a real absence of habitation sites. A recent systematic survey of the middle and upper Nasca valley has located numerous Nasca sites, ranging in size from a dozen to several hundred houses. The distribution of Nasca sites is seen to be dependent on the availability of water resources and arable land. Changes in settlement patterns during the Early Intermediate Period indicate some important changes in Nasca society.

Schroeder, Kelly J. (Arizona State)

[53] HOHOKAM MORTUARY REMAINS AND VILLAGE MOVEMENT AT PINNACLE PEAK VILLAGE-AZ:U:5:3(ASU)

This paper reports on the spatial location of mortuary remains, trash mounds, and pithouses at a prehistoric Hohokam site, and proposes that in addition to such controlling variables as physical environment, subsistence practices, population increase, and social stratification, the Hohokam's mortuary practices played an important role in influencing the directional growth and movement of their village. The site under investigation is Pinnacle Peak Village, located in Boulder Pass of the McDowell Mountains of south-central Arizona.

Schuldenrein, Joseph (Gilbert-Commonwealth)

[17] SOIL PHOSPHATE "PRINTS" AND THE DETECTION OF ACTIVITY LOCI AT PREHISTORIC SITES

Soil phosphate "prints" represent geochemical enrichments of sediments by cultural activities. For some time researchers have measured both qualitative and quantitative changes in archaeological sediments to classify ancient activity areas. Since most efforts have been site-specific, the discriminatory power of the method is limited. By applying the method uniformly at functionally and environmentally distinct sites, the broad utility of the strategy is tested. In a key case, a Mississippian eastern Woodlands complex and a Plains hunting camp contained strikingly similar contrasting phosphate "prints" that indexed performance of analogous activities in contrasting settings. A graphic method is suggested for standardizing presentation and interpretations of results.

Schurr, Mark (Indiana)

[55] THE SIGNIFICANCE OF MIDDLE MISSISSIPPIAN MORTUARY TREATMENTS: A STATISTICAL AND ISOTOPIC PERSPECTIVE

The social significance of mortuary variation within the prehistoric Middle Mississippian populations of the southeastern United States can be interpreted using many different referents. For example, ethnographic accounts have been used as indirect evidence that some mortuary treatments are correlated with differential access to dietary resources. The conjunctions of mortuary variation with variations in the carbon and stable isotope ratios of prehistoric burials from the Angel Site (a Middle Mississippian residential and ceremonial center in southwestern Indiana) demonstrate both the limitations and advantages of ethnographic and statistical analyses of prehistoric mortuary treatments.

Schwartz, Glenn M. (John Hopkins)

[46] EXCAVATIONS AT TELL RAQA': A SMALL RURAL SITE OF EARLY URBAN NORTHERN MESOPOTAMIA

The mid-third millennium B.C. site of Tell Raqa' in the middle Habur valley of northeast Syria is the focal point of an excavation project investigating the social and economic organization of a small rural community and its integration into the newly emergent urban and state systems of north Mesopotamia. Two seasons of excavation, exposing about 60 percent of the two latest third millennium occupation levels, have supplied evidence of significant social differentiation at the site and of the existence of specialized production activities extending beyond an agricultural subsistence economy.

Scott, L. (see Bousman, C. B.) [67]

Scott, S. L. (see Jackson, H. E.) [36]

Seaman, Mark F. (Kent State)

[5] THE INTRUSIVE MOUND CULTURE OF SOUTHERN OHIO AND THE BOW AND ARROW PROBLEM

The Intrusive Mound Culture has been a vague Woodland taxonomic designation in the Ohio Valley since the 1950's, but has itself received little analytical attention. The historical development of this Culture is reviewed and new information is introduced relating to its temporal, spatial, and adaptational position in local sequences. The probable relationship between the Intrusive Mound Culture and the adoption of bow and arrow technology is also explored in light of Odell's [1988] recent arguments on Woodland innovations in projectile weaponry.

Seaman, M. F. (see Maslowski, R. F.) [5]

Selvaggio, Marie and Robert J. Blumenshine (Rutgers)

[43] ESTABLISHING THE TAXON-SPECIFICITY OF CARNIVORE TOOTH MARKS ON BONE

Carnivore tooth marks on Plio-Pleistocene archaeological bone are frequently attributed to hyenas, because it is assumed they would be the most likely scavengers of hominid bone refuse. This assumption, however, has not been demonstrated. Hyena gnawed bone collected from naturalistic settings documents the frequency and anatomical patterning of tooth marks. As a necessary prerequisite to establishing the taxon-specificity of hyena tooth-marked bone, research in a controlled setting was conducted to document the characteristic marks produced by different hyena teeth. Methodology, results and implications of our data to interpretations of Plio-Pleistocene archaeological bone assemblages are discussed.

Shackel, Paul (Maryland-College Park) and Barbara J. Little (George Mason)

[54] HISTORICAL ANTHROPOLOGY IN ANNAPOLIS, MARYLAND: ONGOING RESEARCH

As most archaeologists in this country are aware, the goals of a "post-processual" archaeology are most feasibly addressed when both historical and archaeological analyses are combined. We use a post-processual approach and goals of understanding social, political, and ideological meanings of material culture to assess the meanings and changes of city plan and artifactual landscape in the historic district of Annapolis. Variability in the archaeological record, in the architectural record, and in landscape are interpreted with respect to changing perceptions in the city of social and political relationships and hierarchy.

Shackleton, N. J. (see Bousman, C. B.) [67]

Shafer, Harry J. (Texas A&M)

[53] THE SWARTS RUIN REVISITED: AN ASSESSMENT OF THE 1920'S EXCAVATION AND DATA POTENTIAL

The Swarts Ruin, excavated in the 1920's, has stood as the case study for Classic Mimbres archaeology. A study of the Swarts Ruin data housed at the Peabody Museum, Harvard University, in light of the intensive investigations at the NAN Ranch Ruin by Texas A & M University, provides the basis for a reevaluation of the previous interpretations by H.S. and C.B. Cosgrove. Their excavation methods and feature documentation are reviewed to demonstrate both the weaknesses and strengths of the Swarts Ruin data base.

Shafer, H. J. (see Hester, T. R.) [46]

Shaffer, B. S. (see Baker, B. W.) [43]

Shaffer, Gary (Louis Berger & Associates) and Sandro Bonardi (Università degli Studi di Parma)

[34] STENTINELLO ROCK FEATURES FROM CALABRIA, ITALY

Extensive research in the southern Italian region of Calabria has revealed one of the densest areas of Neolithic settlement known in the Western Mediterranean. The settlements on the Piana di Curinga belong to the Stentinello culture from the 6th and 5th millennia B.C. and contain well preserved wattle and daub buildings. Associated with the Stentinello structures are a number of rock features. This paper analyzes 20 of the features recovered through excavation. Metrical, morphological, and petrological data from the rock features are used for intra- and inter-site comparisons. Attention is also focused on explaining feature function and on making comparisons with other Italian contexts.

Shaffer, Jim G. (Case Western Reserve)

[10] THE EARLY SOUTH ASIAN STATE: A NON-TRADITIONAL MODEL

The archaeological record of South Asia has changed considerably over the last decade. Consequently, it is now possible to develop an interpretive model presenting South Asian development as reflecting a single cultural tradition through time, which culminated in a unique first millennium B.C. example

of state formation. Moreover, it now appears that this state formation took place against a multi-ethnic background unparalleled in the ancient world and that this situation, rather than the so-called Indo-Aryan/European invasions, was responsible for the unique features and literature of the early South Asian state.

Shapiro, G. (see Jones, B. C.) [44]

Shapiro, G. (see Hann, J. H.) [44]

Sharer, Robert (Pennsylvania)

[11] PRECLASSIC FOUNDATIONS OF CLASSIC MAYA POLITICAL SYSTEMS

Recent research indicates that Classic Maya political systems were the product of a complex, multilinear process beginning well within the Preclassic era. This process occurred within a broad array of environmental and cultural regions, centered on the lowland heartland and a far more vast periphery. Consistent material and symbolic manifestations from the Preclassic archaeological record are examined as evidences of complex political evolution in both the central lowlands and the southern periphery, allowing the reconstruction of the interaction networks that generated the growth of polities upon which the Classic period political order was built.

Sheets, Payson D. (Colorado)

[75] A COMPARISON OF DIGITAL AND OPTICAL REMOTE SENSING INSTRUMENTS IN COSTA RICA

A NASA cooperative agreement provided the Proyecto Arenal an abundance of remotely sensed imagery. In spite of the obstacles (precipitation, rainforest, multiple burial by volcanic ash layers, and relatively simple societies with minimal environmental impacts), some instruments did detect prehistoric features. Eroded footpaths were found linking sites; they are the physical remains of the prehistoric network of transportation and communication. A comparative evaluation of optical systems ranks them as follows, beginning with the most successful: color infrared, color, and black-and-white. The ranking of digital systems is: Thermal Infrared Multispectral Scanner, Lidar (laser), Synthetic Aperture Radar, and Landsat TM.

Sheldon, Craig T. Jr., John W. Cottier (Auburn) and Gregory A. Waselkov (South Alabama)

[76] CREEK ARCHAEOLOGY ON THE LOWER TALLAPOOSA RIVER

Recent intensive surveys, excavations, and ethnohistorical research in the Lower Tallapoosa River Valley of central Alabama have produced a large body of information on Protohistoric and Historic Creek Indian culture. Ongoing analysis is providing increased understanding of settlement patterns, public and domestic architecture, burial practices, material culture and culture history, as well as specific interpretations at the historic Creek towns of Hoithlewalli, Fusihatchee and Hickory Ground.

Shelley, P. (see Larralde, S.) [12]

Shipman, Pat (John Hopkins)

[66] SARDINIA'S EARLIEST IMMIGRANTS AND THEIR IMPACT ON THE INDIGENOUS FAUNA

The earliest known human occupation of Sardinia, Corbeddu Cave, consists of cultural levels from at least 13,590±140 B.P. to 6,260±180 B.P., containing stone tools, human remains, and a well-preserved faunal assemblage. The site is important not only in terms of the initial peopling of this Mediterranean island, but also with respect to the heavy impact hunting inflicted on the indigenous fauna. The sequence of deposits records the transition from a hunting-gathering subsistence economy to one involving domestication. This study focuses on taphonomic interpretations of the cervid and canid remains, as well as examination of pathologies which may be related to environmental stress.

Shott, Michael J. (Kentucky)

[64] STONE TOOLS AND ECONOMIES: A GREAT LAKES PALEOINDIAN EXAMPLE

In forager societies, "economy" normally is identified with subsistence. In a broader perspective, however, it concerns the cultural context of production, distribution and use of goods. This perspective is especially important in eastern Paleoindian studies, where economy often can be approached through stone tools alone. The economic practices of Paleoindian foragers in the Great Lakes region are evaluated in this way. In addition, patterns in the production, distribution and use of tools themselves—the economics of tool use—are compared between successive groups and linked to the broader cultural systems of which they formed a part.

Shott, M. J. (see Jefferies, R. W.) [5]

Siegel, M. I. (see Hyland, D.) [39]

Siemens, Alfred H. and Alastair Robertson (British Columbia)

[73] WETLAND LANDSCAPES OF LOWLAND EL ORO

"Pozas" and "pans" have been hypothesized as Prehispanic subsistence resource concentrations. New data from vertical and oblique aerial photography, intensive ground surveys, ethnographic inquiry, botanical surveys and sediments analysis is being synthesized on 1:2,500 base maps for representative wetlands and their surroundings, and integrated with results from Tahuin Project settlement surveys. The morphology, origin and use of the wetlands is being clarified. New oblique aerial photography over the Santa Elena Peninsula has opened comparative perspectives on resource use on the two sides of the estuary. The paper treats both methodology and substance, making central what is often introductory in archaeological exposition.

Silverman, Helaine (Illinois)

[42] THE PEOPLE WHO MADE THE NAZCA LINES: SETTLEMENT PATTERNS IN THE INGENIO RIVER VALLEY, NAZCA, PERU

For too long the Nazca lines have been treated as an astronomical, mathematical, or exotic problem devoid of cultural content. Yet, for some time we have known that they were made by the same people who painted beautiful polychrome pottery between 1-700 A.D. on the south coast of Peru and who built the large urban sites in the same region (ca. 1000-1400 A.D.). Until recently, there has been no direct evidence linking the great ground markings to these cultures. The results of survey in the Ingenio Valley, on the north side of the pampa, provide this crucial information and yield significant new data for a broad interpretation of these phenomena.

Silvestre, Ramon (Arizona)

[31] BASKETRY STANDARDIZATION IN A TRIBAL SOCIETY

A formal typology of Kalinga basketry is presented to facilitate the study of variation in their regional, material, structural and functional form, and from this initiate the beginning of a basketry standardization study. Recent studies of pottery standardization are assessed using Kalinga basketry. I demonstrate, for example, the subtle stylistic variations in basketry that permit the identification of individual weavers in an attempt to reveal relevant dimensions between specialization and product standardization. This study further explores and fills a gap in basketry ethnoarchaeology as an additional container type along with pottery.

Simek, Jan F. (Tennessee) and Robert C. Dunnell (Washington)

[17] ARTIFACT DENSITY, SHERD SIZE AND PLOWZONE PROCESSES AT ROBARDS FARM (DUNKLIN COUNTY, MISSOURI)

Based on repeated and complete surface collections made at the Robards Farm (Dunklin County, Missouri), artifact spatial patterning over several square kilometers can be examined. This paper reports on ceramic sherd size variation over space. For both sand and shell tempered ceramics, large sherds (those significantly bigger than the average in each class) are highly localized. Large sherd sizes and concentration locations vary between temper types. These patterns are interpreted as reflecting varied site formation processes. The dynamic nature of plowzone processes and temporal variability are seen as especially relevant in explaining the observed patterns at Robards Farm.

Simmons, Alan (Desert Research Institute)

[81] PYGMY HIPPOS AND EARLY HUMAN ADAPTATIONS IN THE EASTERN MEDITERRANEAN

Akrotiri-Aetokremnos ("Site E") in southern Cyprus represents an unique archaeological occurrence for the Mediterranean. First, it predates the earliest documented human occupation of the Island by at least 500 years, if not more. Second, and more importantly, is the association of cultural materials with an extinct Pleistocene fauna, pygmy hippopotamus. A very well preserved faunal assemblage suggests butchering. Such a relationship has never before been demonstrated in the Mediterranean. The significance of Site E in terms of pre-agricultural adaptations to island environments and the possible role of man in the extinction of pygmy hippopotamus are addressed in this paper.

Simmons, A. (see Kafafi, Z.) [81]

Simon, Arleyn W. (Arizona State)

[14] VILLAGE SELF-SUFFICIENCY IN CERAMIC PRODUCTION: A CENTRAL ARIZONA CASE

Although the presence of ceramic specialization is a measure of increased village complexity, it has been difficult to document in sites where production was limited to plainwares. A study concerning village self-sufficiency in ceramic production is presented with implications for village autonomy and intra-regional relationships. Results are given of an integrated ceramic analysis using plainware assemblages of five large village sites (ca. A.D. 1000-1200) in the Payson Region of central Arizona.

Analyses of vessel form, performance characteristics, composition and typology are used to assess the homogeneity and continuity of ceramic assemblages among these sites.

Sinopoli, Carla M. (Michigan)

[10] THE POLITICAL ECONOMY OF A SOUTH INDIAN EMPIRE

The Vijayanagara Empire dominated south India from the 14th-16th centuries A.D. The political and economic organization of that empire are examined in the context of models of imperial societies derived from other pre-modern imperial formations. Discussion will focus on military organization, the structure of the Vijayanagara bureaucracy, the role and influence of local rulers in supporting or subverting imperial organization, and the economic base of the empire and its political capital. Archaeological, documentary and historic evidence will be examined.

Skibo, James (Arizona)

[31] THE KALINGA COOKING POT: AN ETHNOARCHAEOLOGICAL AND EXPERIMENTAL EVALUATION OF PERFORMANCE CHARACTERISTICS

A pot use study among the Kalinga of Northern Luzon, the Philippines, provides information on the relationship between vessel performance characteristics and cooking pot selection. Nearly all the households in the village of Guina-ang have enough metal pots for rice and ceramic pots for vegetable and meat cooking. The performance characteristics of cooking important in making their pot selections are discussed and suggestions are offered about the role of performance characteristics in technological change. Finally, the behavioral significance of heating effectiveness, an important performance characteristic in this study, is assessed experimentally.

Smith, Jr., Marion F. and John F. Scarry (Florida Bureau of Archaeological Research)

[52] A DISQUIETING SYNTHESIS OF APALACHEE FORT WALTON: MICRO-SCALES FOR MISSISSIPPIAN RESEARCH

We synthesize existing data on the Fort Walton Mississippian polity linked to the historic Apalachee. What is known has disturbing implications for the study of late prehistory at regional scales in eastern North America: notably, demographic trajectories varied vastly on a very small spatial scale, kilometers and not tens of kilometers, for areas believed to have been included within the polity. Regional research designs are more necessary than ever wherever this pattern of microtemporal and microspatial variation holds. How may they be optimized to meet the problems we have encountered?

Smith, Bruce D. (Smithsonian) [Discussant 57]

Smith, George (National Park Service), Veletta Canouts (Smithsonian), Francis P. McManamon and Richard C. Waldbauer (National Park Service)

[63] THE CURRENT AND FUTURE ARCHAEOLOGICAL ASSISTANCE PROGRAM

Under the direction of the Departmental Consulting Archaeologist, the Archaeological Assistance Program provides leadership and coordination for Federal archaeological activities. Areas in which this program focuses are: information exchange, interagency coordination, technical publications, and regulations and guidelines. Special emphasis currently is being given to public awareness, training, and the National Archaeological Database.

Smith, M. T. (see Hally, D. J.) [1]

Smith, M. B. (see Kaplan, L.) [49]

Smith, S. (see Rippeteau, B.) [63]

Smyth, Michael P. (New Mexico)

[4] THE SPATIAL ORGANIZATION OF HOUSEHOLD STORAGE BEHAVIOR: AN ETHNOARCHAEOLOGICAL VIEW FROM THE PUUC REGION OF YUCATAN

Research into maize storage behavior among the Puuc Maya has revealed that storage is closely interrelated with daily food processing activities. This information has enabled the development of a storage model based on spatial and activity scheduling at modern houselots. This organizational framework can be employed by archaeologists to interpret the material remains of storage behavior. Variability in storage techniques is also an important component that differentiates spatial usage at Puuc houselots. An understanding of how maize storage techniques condition space at the houselot can provide archaeologists with valuable information for interpreting the materials associated with storage and other household activities.

Sneddon, L. A. (see Kaplan, L.) [49]

Snedeker, Rodney J. and Michael A. Harmon (USFS-North Carolina)

[33] ARCHAEOLOGICAL VANDALISM IN THE SOUTHEASTERN NATIONAL FORESTS

The increase in vandalism of archaeological sites on National Forest System lands in the Southern Region is examined. The causes and effects and efforts to stop vandalism are discussed using examples from National Forests throughout the southeast. The Uwharrie National Forest in North Carolina is emphasized in order to examine the effectiveness of State and Federal efforts to stop vandalism. This paper represents part of a regionwide effort to better understand vandal and collector behavior and networks, and to focus the attention of professionals and the public on the need to protect archaeological sites on public lands.

Snedeker, R. J. (see Radisch, W. H.) [27]

Snow, F. (see Blanton, D. B.) [40]

Snyder, Lynn M. and P. Willey (Tennessee)

[55] CANID MODIFICATION OF HUMAN SKELETAL REMAINS: A COMPARISON OF ARCHAEOLOGICAL MATERIALS FROM CROW CREEK

Canid modification of human skeletal remains is influenced by factors such as initial body condition, length of exposure time, and accessibility to scavengers. Three data sets are considered: archaeological remains from a large scale 14th century massacre, modern forensic cases, and a control sample of white-tail deer carcasses fed to gray wolves. Variability in canid modification is assessed based on presence/absence of skeletal elements, differential destruction of element portions, and the presence of observable modification on surviving specimens.

Sobolik, Kristin O., Vaughn M. Bryant, Jr. and D. Gentry Steele (Texas A&M)

[67] PALEONUTRITION: THE NECESSARY INTEGRATION OF DISCIPLINES

Paleonutrition analyses have the potential to provide insights into a population's health, supplying answers to previous unanswered questions, pinpointing nutritional deficiencies, and possibly exposing cause and effect relationships of specific dietary deficiencies and health problems. In order to conduct a paleonutritional analysis a variety of studies must be considered since no single discipline provides all of the information needed. Aspects that need to be analyzed for a complete nutritional statement include zooarchaeological material, ethnobotanical data, coprolite studies, and bioarchaeological data. This presentation critically evaluates the contributions possible from each subdiscipline and illustrates how they must be integrated in order to provide the information needed for a complete paleonutritional analysis.

Soffer, Olga (Illinois)

[66] SOCIAL TRANSFORMATION AT THE MIDDLE-UPPER PALEOLITHIC TRANSITION: THE IMPLICATIONS OF THE EUROPEAN RECORD

The archaeological record for Middle and Early Upper Paleolithic adaptations is combined with paleoanthropological data on Neanderthals and early anatomically modern humans to argue that the middle to Upper Paleolithic transition involved major economic and social transformations. These included 1) division of labor, sharing, and bi-parental provisioning of the young, and 2) pair bonding and the ensuing synchronic and diachronic kin bonding. The European data suggest that this transformation neither involved the emergence of new capacities for such behavior nor was it exclusively associated with a particular type of hominid.

Soffer, Olga (Illinois) [Discussant 51]

Soffer, O. (see Vandiver, P.) [66]

South, Stanley (South Carolina Institute of Archaeology & Anthropology)

[22] FROM THERMODYNAMICS TO A STATUS ARTIFACT MODEL

A step-by-step presentation of information from the energy-based dissipative structure concept of the laws of thermodynamics to a "Status Artifact Index Model," using sixteenth century Spanish colonial artifact and architecture data from Santa Elena, is presented. The model can be used to quantitatively measure, through artifacts, the socio-economic status level of domestic households represented by sixteenth century Spanish colonial artifact assemblages. It has been tested with data from Santa Elena, the sixteenth century capital of Spanish Florida. An example is presented of the integration of archaeological data at the site-specific, artifact-specific level with an energy theory framework useful in examining class structure and other culture processes reflected by the archaeological record.

Spath, Carl (Wyoming)

[73] THE WHITE-ON-RED HORIZON RECONSIDERED: POSSIBLE IMPLICATIONS OF POST-FORMATIVE SETTLEMENT CHANGES AROUND THE GULF OF GUAYAQUIL

A few decades ago aboriginal Ecuador was presented as an intermediate backwater between the Andean and Mesoamerican centers of high civilization. Subsequent work is slowly but radically changing that picture. The emerging picture of shifts and intensification in post-Formative settlement in southwest lowland Ecuador suggest a key and primary role in cultural developments in Nuclear America. Aspects of terminal Formative and Regional Development settlement patterns in and around the Gulf of Guayaquil are discussed in terms of the possible maritime foundations of Andean and Mesoamerican civilization.

Speth, John D. (Michigan) and Katherine A. Spielmann (Arizona State)

[57] PREHISTORIC HUMAN DIET AND SUBSISTENCE STRATEGIES: THE CONTRIBUTIONS OF FAUNAL STUDIES

Over the past half century, faunal research has moved from a peripheral and largely descriptive role to one which is becoming increasingly central to studies of human evolution. After a brief overview of the development of faunal studies as a coherent discipline, and of recent methodological and theoretical issues (e.g., taphonomy, utility indices), this paper considers three specific topics which have been the focus of much recent faunal research: 1) the problem of quantifying and interpreting faunal assemblages; 2) the role of hunting and scavenging in early hominid adaptations; and 3) the importance of protein, fat, and carbohydrate as energy sources in forager diet.

Speth, John D. (Michigan)

[47] TAPHONOMY AND HUMAN BEHAVIOR: PROBLEMS IN DISTINGUISHING CULTURAL AND NON-CULTURAL AGENTS

Taphonomists have made significant contributions to the study of prehistoric faunal remains, often demonstrating that patterning once thought by archaeologists to derive from, and directly reflect, past human activities is instead the product of non-human agents. However, while taphonomists have clearly recognized the diversity of non-cultural processes affecting faunal assemblages, they often have viewed human behavior from a normative perspective that may seriously underestimate variability in faunal assemblages that actually derives from human activities. This paper briefly explores the kinds of culturally derived patterning in faunal assemblages that may incorrectly be attributed to non-human agents and suggests areas of research in need of further clarification.

Spielmann, K. A. (see Speth, J. D.) [57]

Spies, Arthur (Maine Historic Preservation Commission)

[30] DEER TOOTH SECTIONING, ERUPTION, AND SEASONALITY OF DEER HUNTING IN PREHISTORIC MAINE

Deer tooth sections cut from specimens of known date of death were examined to discover when, and at what rate, annual layers are deposited in the cementum of Maine deer teeth. The accretion rate of the growth layer is not constant, but decreases throughout the growth season. This study improves the precision in interpreting tooth sections from prehistoric archaeological specimens for season of death.

Staller, John E. (Museo Antropologico del Banco Central del Ecuador)

[73] ADAPTIVE STRATEGIES OF PREHISPANIC SETTLEMENT SYSTEMS IN THE LOWER ARENILLAS RIVER DRAINAGE, EL ORO PROVINCE, SOUTHERN ECUADOR

A Regional Settlement Survey in the Lower Arenillas River Valley in southern Ecuador has recorded the presence of major prehispanic settlement systems from Early Formative (3,300-1,500 B.C.) to Integration Period (A.D. 1,100-1,532) times. Methodological techniques in carrying out the survey are presented. An assessment of site sizes, site locations, and population estimates are employed to arrive at a general model of sociocultural evolution for the entire prehispanic sequence. The ramifications of the settlement data to existing models of sociocultural development are briefly addressed.

Stallings, Richard (Mississippi)

[79] A CRITICAL REVIEW OF OBSIDIAN TRADE ROUTE MODELS FOR THE MAYA AREA

A critical examination is made of the obsidian trade models for the Maya area proposed by Norman Hammond and Fred Nelson. In addition, a new set of models covering the period from the Early Preclassic through the Postclassic are presented and the importance of the Southern Highland obsidian sources is stressed. These models support several theories regarding the importance of certain geographic areas and cities in the Southern and Northern Highlands and the Southern, Central and Northern Lowlands.

Stanish, Charles (Field Museum)

[6] DOMESTIC ARCHITECTURE AT PUKARA JULI, A LUPAKA PERIOD SITE IN THE TITICACA BASIN

Domestic architecture can serve as one of the most sensitive indicators of ethnicity in the prehispanic south-central Andes. The potential of contextual methodologies based upon the household is discussed and the problem of site intrusion versus diffusionist models of cultural process is specifically addressed. Domestic architecture from the fortified hilltop site of Pukara Juli in the Lake Titicaca basin of Peru is used to illustrate this approach.

Stark, Barbara L. (Arizona State)

[29] MODELING CERAMIC PRODUCTION IN LA MIXTEQUILLA, CENTRAL VERACRUZ, MEXICO

Evidence from survey and surface collection over approximately 40 square kilometers documents varied ceramic production through a long prehistoric sequence. A marked degree of specialization is not evident until the Postclassic when *comal* production appears to have been localized at a set of residences in one part of the survey area. A model of scattered specialized ceramic production as an adjunct to mixed household activities within a predominately agrarian economy is developed, applicable primarily to the Classic period. The general pattern is similar to that of the Maya lowlands and contrasts with highland urban patterns.

Stark, Barbara L. (Arizona State) [Discussant 35]

Stark, Barbara L. (Arizona State) [Discussant 4]

Stark, B. L. (see Hall, B. A.) [4]

Stark, Miriam (Arizona)

[31] THE REGIONAL EXCHANGE SYSTEM: AN ETHNOARCHAEOLOGICAL CASE STUDY

Ethnoarchaeological research in northern Luzon, Philippines, focuses on pottery manufacture and exchange. Tribal Kalinga potters have shifted in the last 15 years from a system of pottery production for household use to pottery production for widespread distribution. This study of the Kalinga ceramic exchange network addresses archaeological issues, documenting the geographical extent of the exchange system; the mechanisms of ceramic distribution; and the frequency and types of vessels that are distributed to settlements of varying distance. The Kalinga exchange network provides a useful case study for archaeologists interested in developing models of prehistoric ceramic exchange.

Steele, D. Gentry and Michael R. Waters (Texas A&M)

[55] OSTEOLOGICAL ANALYSIS OF HUMAN SKELETAL REMAINS ASSIGNED TO THE SULPHUR SPRINGS STAGE OF THE COCHISE CULTURE (CA. 8,200 - 10,400 B.P.)

Two Early Holocene skeletons recovered from AZ FF10:14, White Water Draw, southeastern Arizona are assigned to the Sulphur Springs Stage of the Cochise Culture (8,200-10,400 B.P.). Together, these represent the oldest human remains from the Southwest and are some of the oldest in North America. One, recovered by Sayles and Antevs, is an adult (25-35 years) female. Both skeletons indicate the existence of an early Southwest population which was small in stature, with individuals exhibiting dolichocranic crania, winged and shovelled central incisors, shovelled lateral incisors, small molars, and platymeric femora.

Steele, D. G. (see Zimmerman, L.) [43]

Steele, D. G. (see Sobolik, K. O.) [67]

Stein, Gil (Smithsonian)

[46] SEGMENTARY STATE AND ORGANIZATIONAL VARIATION IN EARLY COMPLEX SOCIETIES: A RURAL PERSPECTIVE

The distinction suggested by ethnographers between "segmentary" and "unitary" states helps to clarify the range of variation in the political and economic organization of ancient complex societies. In these systems, the degree of economic specialization in village production can measure regional integration between centers and hinterlands. Faunal and other economic data from the mid-third millennium B.C. village of Gritille in southeast Turkey suggests a low level of economic integration apparently characteristic of segmentary states. Rural organization in these relatively primitive polities differs markedly from that of more complex, unitary states such as nearby Ebla in third millennium North Syria.

Stein, Julie K. (Washington)

[7] WHAT MAKES A SHELL MIDDEN?

Although shell middens are considered a "type of site," distinct from "lithic scatters," "kill sites," and "habitation sites," the only attribute that all shell middens have in common is the presence of shell. Portions of shell middens could be lithic scatters, kill sites, or habitation sites. Therefore, to discuss shell middens in a global sense, one has to focus on the only attribute that all shell middens share—the shell. Interpretations of shell involve its species, season of death, preferred habitat during life, mode of death, deposition, and post-depositional alterations. These are taphonomic characteristics, involving the passage of organisms with shell from the biosphere to the lithosphere. Thus, the only unifying aspect of all research on shell middens is the taphonomy of the shell.

Steinen, Karl T. (West Georgia)

[76] A REEVALUATION OF WILLIAM H. SEAR'S EXCAVATIONS AT THE ETOWAH MOUNDS, 1953

In 1953, William H. Sears excavated an extensive series of test units in the village area of the Etowah site. These were designed to determine the stratigraphy of the site as well as gather information on ceramic sequences, house structures and other cultural variables. These data have, to date, received little attention by archaeologists working in the Southeast. This paper is a reexamination of Sears' data in an effort to discern aspects of the cultural occupation of the Etowah village area. Questions of ceramic distributions are addressed as are aspects of the use of various locations in the village area of the site through time.

Steponaitis, V. P. (see Prezzano, S. C.) [68]

Stewart, Michael (Louis Berger and Associates, Inc.)

[19] PREHISTORIC EXCHANGE ACROSS THE ARCHAIC-WOODLAND INTERFACE IN THE MIDDLE ATLANTIC REGION

The Early Woodland period is characterized by a decline relative to the preceding Terminal Archaic in the volume, but not the geographical extent, of chipped stone artifacts made from materials that occur within the region and which circulated through both broad-based and focused types of exchange networks. In contrast, the incidence of artifacts made from materials originating outside of the region slowly increased through the Early Woodland period in comparison with the levels documented for the Terminal Archaic period. The implications that these changes have for traditional views of these periods are discussed.

Stewart, M. (see Custer, J.) [64]

Stiner, Mary C. (New Mexico)

[47] MORTALITY PATTERNS AS INDICATORS OF UPPER PLEISTOCENE HUMAN PREDATOR NICHE: A COMPARATIVE PERSPECTIVE

A comparative perspective on the prey selection habits of predators and other causes of death in prey populations is needed to interpret archaeological mortality patterns. This paper examines the range of variation in prey age selection among modern predators relative to other natural mortality phenomena and defines a prey age variable that is useful for distinguishing modern predator niches. Some prehistoric human-generated mortality patterns from Upper Pleistocene Italy and Holocene North America are then compared within this framework. In all cases, humans/hominids behaved as ambush predators or scavengers. Significant temporal variation in habitual prey selection and, by implication, the relative emphasis of access methods corresponds to climatic deterioration of the last glacial but may predate the Middle/Upper Paleolithic transition as defined from tool industries.

Stone, Doris (Tulane & Peabody Museum) [Discussant 75]

Stone, J. (see DeFrance, A. S.) [48]

Storck, Peter L. (Royal Ontario Museum) and John Tomenchuk (Center for the Study of Early Man)
[64] THE FUNCTION AND SIGNIFICANCE OF AN EARLY PALEOINDIAN CACHE OF INFORMAL TOOLS AT THE UDORA SITE, ONTARIO

The results of a parametric use-wear analysis of a cache of tools presumed to have been deposited by Gainey Complex peoples are presented. Forty of the 79 informal tools are suited for parametric analysis. The results indicate that all 40 were used in a seasonally specific task, possibly the processing of tree roots, and perhaps by three female individuals. This suggests that the individuals who deposited the cache anticipated visiting the site or vicinity during the same season in the future, an activity that has important implications for patterns of land use.

Stothers, David M. and Timothy J. Abel (Toledo)

[19] LATE ARCHAIC-EARLY WOODLAND BAND SOCIETIES AND THE WILLIAMS MORTUARY COMPLEX OF THE WESTERN LAKE ERIE REGION

Cultural continuity suggested for Late Archaic Feeheley (2,500-600B.C.) and Early Woodland Leimbach (600 B.C. - 1 A.D.) phases in the Western Lake Erie region is reflected in settlement-subsistence, mortuary, trade and exchange systems, and artifact assemblages. Evidence from independent drainage systems suggests that local microband configurations were interconnected through a regional macroband center consisting of the associated Williams Cemetery and Sidecut Crematory sites. It is also suggested that several elite information and commodity controlling lineages focused regional trade and exchange and its associated mortuary ceremonialism at this center, which was linked to other large and distant regional centers throughout the Eastern Woodlands.

Stoher, Karen E. (Museo Antropologico del Banco Central del Ecuador) [Discussant 73]

Stright, Melanie J. (Minerals Management Service) [Discussant 50]

Stuart, David (Princeton)

[11] THOUGHTS ON TERRITORIAL ORGANIZATION WITHIN CLASSIC MAYA STATES

Hieroglyphic inscriptions from the western Maya lowlands often mention a class or office of nobles who ruled small satellite sites within large polities. The apparent rise of these ruling subsidiaries in the Late Classic period (A.D. 650-800) may have helped to define the territorial domains of the large western polities centered on Palenque, Yaxchilan, Piedras Negras, and other sites. This phenomenon seems to have been restricted to the western lowlands and perhaps areas of present-day Campeche, and might suggest some degree of variation in the internal organization of ancient Maya states.

Sugiyama, S. (see Cowgill, G. L.) [69]

Sullivan, Alan (Cincinnati) and Christian E. Downum ()

[12] REGIONAL IMPLICATIONS OF WUPATKI SETTLEMENT PATTERNS

A total of 2,397 prehistoric sites were recorded during the intensive inventory of Wupatki National Monument. Analytical results of data collected during the survey are discussed as they pertain to 1) the occupational history of the monument, 2) spatial and temporal distributions of site types, 3) variation in assemblage content and site function through time, and 4) "cultural variation" through time. With this information, new models of land-use, rates of site establishment, and population levels are presented. These new models and estimates provide a framework for discussing regional settlement dynamics and adaptive strategies in the Flagstaff, Grand Canyon, and Black Mesa areas between A.D. 1070 and A.D. 1270.

Sullivan, Lynne P. (New York State Museum)

[36] HOUSEHOLD AND COMMUNITY ORGANIZATION OF THE MOUSE CREEK PHASE

The composition of Mouse Creek phase domestic facilities and their spatial arrangements within settlements provide data for interpreting household and community organization of this Late Mississippian society. Comparisons with early historic and other late prehistoric complexes in the Upper Tennessee Valley suggest changes in regional socio-political organization. The developmental trend can be characterized as a shift from politically centralized chiefdom societies to relatively nonhierarchical tribal societies.

Sullivan, L. P. (see Neusius, P.) [68]

Sutliff, Mary Jo ()

[73] DOMESTIC PRODUCTION OF SMALL COPPER ARTIFACTS DURING THE MILAGRO CULTURE OCCUPATION AT PEÑON DEL RIO (GUAYAS BASIN)

Small copper artifacts from domestic contexts of the Milagro Culture occupation at Peñon del Rio indicate that some metallurgical production occurred at the household level. While the sample recovered includes a high variability of end-products, many of these appear to have been fabricated from two essential "blanks," classified here as square wire and strips. An integrated production system is proposed which is argued to have allowed more artisans to practice metallurgy by obtaining these preforms through trade. The importance of a general model which reconstructs the metal-working process is emphasized for purposes of identifying archaeological contexts where this activity took place.

Sutter, L. L. (see Martin, P. E.) [76]

Sutton, Mark Q. (California State-Bakersfield)

[37] PREHISTORIC DIETARY PREFERENCES IN THE SALTON BASIN, CALIFORNIA

An analysis of faunal and floral remains recovered in coprolites from several sites in the Salton Basin, California, reveals several patterns of resource preference and utilization. Specifically, the distribution of fish elements throughout the sample suggests that certain parts were being eaten in conjunction with other plants and animals, thus illuminating dietary preferences and utilization patterns during late prehistoric times.

Swan, Charles P. (I), Patrick E. McGovern and Stuart J. Fleming (MASCA-Pennsylvania)

[39] CHARACTERIZATION OF ANCIENT MATERIALS USING PIXE SPECTROMETRY

This paper describes the general physical processes of proton induced x-ray emission (PIXE) spectrometry that underlie its advantages as an analytical tool in the study of ancient materials, and reviews the practical limitations met in the routine determination of some elements in certain matrices (e.g., cobalt in a bronze, and tin in a leaded glass). A summary of applications of the technique will include 1) a study of the quality of iron-making in post-Revolution U.S., 2) a new look at colorants used in 18th Dynasty Egyptian glassmaking, and 3) an assessment of the origins of raw materials used in making Sumerian bronzes.

Swezey, William R., Eugenia J. Robinson and Castulo Puc Raxon (CIRMA)

[56] ARCHAEOLOGICAL SURVEY OF THE SOUTHEAST CAKCHIQUEL SPEAKING REGION

In April 1988 CIRMA (Centro de Investigaciones Regionales de Mesoamerica) began archaeological survey of the Cakchiquel speaking region. Investigations in the Department of Sacatepequez has located over 100 sites which span the Middle Preclassic through Colonial eras. This paper reviews the results of the survey and evaluates existing hypotheses concerning settlement patterns in the southeastern corner of the Cakchiquel region.

Tankersley, Kenneth B. (Glenn A. Black Laboratory-Indiana)

[64] I WOULD RATHER BE HERE THAN OUT ON THE TUNDRA

Over the past 60 years two dominant and competing models of early Paleoindian economy in the Midwestern United States have emerged—specialized hunting and generalized foraging. Both models are predicated upon assumptions about optimal foraging behavior, the antiquity of humans in the Midwest, paleoecological reconstructions, the behavior of large gregarious herbivores in complex environmental settings, and the temporal placement of their extinction. These assumptions are evaluated by identifying patterns in lithic exploitation and human settlement. This evaluation demonstrates that the early Paleoindian economy of the Midwest was specialized hunting, but in conjunction with foraging activities.

Taschek, J. T. (see Ball, J. W.) [11]

Tay, Anne Pike (New York)

[51] CHANGES IN SEASONAL EXPLOITATION OF RED DEER IN THE UPPER PALEOLITHIC OF SOUTHWEST FRANCE

During intervals of climatic amelioration from 33,000 to 10,000 B.P. in the Aquitaine Basin of southwestern France, red deer was the main prey of the late Pleistocene hunter. Determination of season of death through cementum annuli analysis and construction of age profiles of the red deer were combined with existing data from reindeer and fish exploitation from seven early and final Upper Paleolithic sites. The results suggest clear differences in the hunting strategies employed during the two periods. These contrasting strategies imply change in the social organization of the hunters as well as an adaptive response to the changing conditions of the terminal Pleistocene environment.

Taylor, R. L. (see Schalk, R.) [70]

Teltser, Patrice (Southern Illinois-Carbondale)

[71] ARCHAEOLOGY AND THE HISTORICAL SCIENCES

Facing apparent failure to create a nomothetic science, archaeologists remain committed to a research program rife with inconsistencies. Relying on explanatory models borrowed from other sciences is inconsistent with building archaeological theory. Nevertheless, it is ironic that discussions of historical sciences, particularly the concepts that enable them to effectively explain change, have been poorly received. Yet, by examining the theoretical underpinnings and methodological implications of historical sciences, archaeologists can begin to unravel many inconsistencies impeding the realization of their goals. What emerges however, is not a set of answers to our questions, but an entirely new set of questions.

Terrell, John and Robert L. Welsch (Field Museum)

[74] TRADE NETWORKS, AREAL INTEGRATION AND DIVERSITY ALONG THE NORTH COAST OF NEW GUINEA

The North Coast is noted for its artistic and ritual traditions, trade networks, craft specializations, and extreme cultural (and ethnolinguistic) differentiation. Both Papuan-speaking and Austronesian-speaking communities share a similar level and kind of cultural development distinct from neighboring areas, most markedly from Papuan groups in the hinterland. Field Museum holds the largest, best documented ethnological collection from Melanesia in the United States. We are analyzing the role of material culture in shaping and maintaining social, economic, and ritual patterns of similarity and difference to evaluate hypotheses (such as F. Tiesler's) about areal integration and how variation in material culture is related to social, ecological, and other contexts.

Tersak, J. M. (see Hyland, D.) [39]

Thomas, David Hurst (American Museum of Natural History)

[44] MISSIONS OF THE SPANISH BORDERLANDS: A TRANS-CONTINENTAL REFLECTION

Although the missions of *La Florida* were constructed according to a Hispanic master plan for the New World, they differed in varying degrees from missions established in the western Borderlands. The 16th and 17th century missions of Spanish Florida are compared and contrasted with their counterparts in the Californias, the American Southwest, Texas, and northern Mexico using both archaeological and documentary evidence. We emphasize the various strategic objectives, the differential responses of the Native American "neophytes" involved, and the relative degree to which missions were judged successful in each area.

Thomas, David Hurst (American Museum of Natural History) [Discussant 41]

Thompson, R. G. (see Mather, D. J.) [21]

Thorne, Robert M. (Center for Archaeological Research-Mississippi)

[33] PRESERVATION IS A USE: SITES CAN BE PROTECTED

Archaeological sites can be protected and preserved through a variety of techniques. In this light, these techniques may be considered to be a viable management tool. Specific cases of site protection and stabilization will be cited to support the value of this approach.

Tillett, Alice C. (Texas-Houston)

[75] SIGNS AND SYMBOLS OF PRECLASSIC NICAYA

Presented here is a discussion of recurring iconographic symbols in Late Preclassic Nicoya and Chorera pottery that reinforces the theoretical proposition of interaction among early Pacific Coast cultures. These iconographic resemblances are examined and the evidence for contact between the two regions is discussed.

Todd, Lawrence C. (Boston)

[47] SEASONALITY STUDIES AND PALEOINDIAN SUBSISTENCE STRATEGIES

The growing body of data on eruption, wear, and crown height of bison lower dentitions from Paleoindian bonebeds provides a substantial basis for the examination of seasonal trends in the use of large game animals by late Pleistocene/early Holocene human groups in western North America. While there is a definite pattern of winter mortality, other lines of evidence indicate minimal processing of the carcasses. Procurement of food resources for storage does not seem to have been a primary concern. This suggests that mass kill-butcher sites may have played a different role in Paleoindian systems than in those of later bison-hunting groups where mass kills were a key component of over-wintering strategies.

Todd, L. C. (see Hofman, J. L.) [40]

Todd, L. C. (see Rapson, D.) [41]

Tomenchuk, J. (see Storck, P. L.) [64]

Tomka, Steve A. (Texas)

[8] THE ETHNOARCHAEOLOGY OF SITE ABANDONMENT IN AN AGRO-PASTORAL CONTEXT

Site abandonment behavior with anticipated return is discussed in a land use pattern consisting of three village segment types: main, pastoral and agricultural. The following categories are distinguished: seasonal, intermittent and permanent. The segments in these abandonment categories are discussed in terms of: 1) assemblage size, 2) associational integrity, 3) cache formation processes, and 4) artifact

quality. Both indoor and outdoor activity area patterns are considered. The effect of abandonment length in conjunction with recycling and scavenging are considered as major factors explaining assemblage content.

Tomka, S. A. (see Mauldin, R.) [8]

Toplyn, M. R. (see Meadow, R. H.) [30]

Torrence, Corbett McP. and Patricia H. Baker (Maine-Farmington)

[77] **ARCHAEOLOGICAL INVESTIGATIONS CONDUCTED IN THE RICHARDSON LAKES REGION OF INTERIOR MAINE**

The results of phase I and II investigations conducted in the Richardson Lakes region of northwestern interior Maine are described. These lakes are situated in the mountainous upper portion of the Androscoggin River drainage system. The significance of this region lies in the fact that it includes both riverine and lacustrine settings occupied and utilized by aboriginal populations. Twelve previously recorded sites were visited and 12 new sites were recorded during the current investigations. These data indicate that the area has been inhabited from the Archaic through the Contact periods.

Tosi, Maurizio (IsMEO)

[72] **TYPES OF SETTLEMENTS AND ECONOMY OF ARABIA IN MIDDLE HOLOCENE TIMES**

Between 5,000 and 3,000 B.C. the material foundations of the Bronze Age civilizations of eastern Arabia emerged as a strong regional adaptation. A critical aspect for future developments is perceptible in the ranking of settlements by qualitative discriminants: craft activity, burial grounds, and monumental stone structures are here discussed in their capacity to define functional variability. A model for the ranking of settlement, also discriminating seasonal patterns of territorial occupation, is proposed from ethnographic work on hunting-gathering societies.

Tourtellot, Gair (Dumbarton Oaks)

[4] **MEASURES OF HOUSEHOLD DIFFERENTIATION AT SEIBAL**

Ancient Maya households can be analyzed and ranked on multiple measurement scales. Excavation data from a large sample of Terminal Classic ordinary households at Seibal will be used to differentiate both within and between households on several arguably social dimensions. The more measurement scales employed, however, the less the consistency of results. Reasons for lack of consistency may lie in formation processes, truncated samples, and research design as much as ancient social mobility.

Tringham, Ruth (UC-Berkeley)

[18] **HOUSEHOLDS WITH FACES: THE PROBLEM OF GENDER IN THE PREHISTORIC ARCHITECTURAL RECORD**

The value of studying prehistoric socio-cultural change at a microscale is emphasized using the household as the primary unit of analysis. The use of architectural remains and related material culture in the archaeological record to verify, refute and validate hypotheses about household cooperative action is discussed with specific examples from Southeast European archaeology. The paper will end with a discussion on the willingness (or not) of archaeologists to give faces (and, therefore gender) to their theoretical/imagined households.

Trostel, Brian (Arizona)

[31] **INTRAVILLAGE CERAMIC PATTERNING: AN ECONOMIC PERSPECTIVE**

In order to better understand intravillage ceramic patterning, a portion of the ceramic data collected by the Kalinga Ethnoarchaeological Project is analyzed from an economic perspective at the household level. Relative household wealth is computed for all households in Dangtalan, Pasil, Kalinga-Apayao. Correlations are explored between household wealth and several variables, including the number of ceramic vessels in each household, the percentage of ceramic vessels versus non-ceramic introduced vessels within each household, and individual household pottery production rates. Relationships between ceramic patterning and economic differentiation at the household level, and possible archaeological implications, are discussed.

Tuffreau, Alain (Centre d'Etudes et de Recherches Préhistoriques)

[2] **MIDDLE PALEOLITHIC SETTLEMENT IN NORTHERN FRANCE**

Recent excavations have provided important new data on the patterns of Middle Paleolithic settlement in northern France. In several sites there is evidence for clearly defined spatial patterns, characterized by varying distributions of fauna, debitage, tools, nodules, etc. In many cases the correct identification of the industries in typological terms requires the exposure of large areas. Clear relationships exist between climatic conditions and Middle Paleolithic occupation in Northern France. Deposits formed

under extreme periglacial conditions appear to lack evidence for occupation. It appears therefore that the occupation of the north-west European Plain by Neanderthal groups was not continuous.

Turano, Frank (SUNY-Stony Brook)

[68] **THE LONG ISLAND ENVIRONMENT: AN EXAMPLE OF CONTACT PERIOD ENVIRONMENTAL RECONSTRUCTION AND EXPLOITATION**

Three hundred years of settlement and land use along the Atlantic Coastal Plain has limited understanding of contact period environmental conditions. Field research coupled with multi-disciplinary resources that encompass literature, historic documents, illustrations and maps, as well as geological, ecological, and early natural history reports, can provide a unified insight into contact period habitats. These sources are used to develop a habitat distribution model for Long Island, New York, at the onset of European settlement. The model provides a basis for understanding the pattern of European settlement and resource exploitation while recognizing the role of Native Americans in habitat alteration.

Urban, P. A. (see Schortman, E. M.) [79]

Urban, P. A. (see Miller, J.) [56]

Van Buren, M. (see Rice, P. M.) [6]

Van Horn, David (Archaeological Associates, Ltd.)

[48] **MECHANIZED ARCHAEOLOGY**

The author's recent book, *Mechanized Archaeology*, and other published and unpublished papers, form the basis of a discussion of applications for skid steer loaders in test and salvage archaeology. In test work, skid steer loaders may be equipped with attachable backhoe and auger units. In salvage work, the same machine can imitate hand digging in arbitrary levels. It can then be used to transport the backdirt to a large-scale hydraulic screening station for processing. This system is up to ten times more efficient than conventional techniques.

Vandiver, Pamela (Smithsonian), Martin Oliva (Antropos Institute) and Olga Soffer (Illinois)

[86] **THE MANUFACTURE AND USE OF A PALEOLITHIC FEMALE FIGURINE FROM DOLNI VESTONICE, CZECHOSLOVAKIA**

A description and analysis of the female figurine, known as the Dolni Vestonice Venus dated to ca. 25,000 B.C., was carried out to characterize the technology of fabrication and firing and to attempt to understand some details of the use of the figurine. The technology of the figurine is related to the rest of the corpus of animal figurine and other ceramic fragments from Dolni Vestonice, reported at last year's SAA meetings. Analyses of replicative studies using clay-bearing loess soils of the same composition and mineralogy from Dolni Vestonice II serve as standards. The limits of interpretation of objects from materials analysis are explored.

Varién, M. (see Lipe, W.) [12]

Vasquez, Ricardo ()

[82] **DEMOGRAPHIC PROFILE OF A LATE PRECONTACT POPULATION OF THE CENTRAL HIGHLANDS OF COSTA RICA**

Between 1982 and 1985 rescue archaeology was conducted at the Agua Caliente site in the central highlands of Costa Rica. The occupation of this site began around 300 B.C. The peak of its population was from A.D. 800 to 1550. Twenty-five different groups of tombs of this period have been excavated. Physical analysis of 184 individuals sheds light on the demographic characteristics of the population.

Vicent-García, Juan (Centro de Estudios Históricos-Madrid)

[7] **SOCIAL AND ECONOMIC CHANGE IN FOURTH MILLENNIUM IBERIA**

Economies developed in the Iberian Peninsula during the fourth millennium B.C., from systems which combined "Neolithic" features with those of developed hunter-gatherers, which already had the principal features of the modern Mediterranean agrarian landscape. The archaeological record for this evolution is highly deficient, however. It is only by taking into account the negative as well as the positive evidence for economic and social change that we can understand this evolutionary process.

Vidale, Massimo (Smithsonian)

[8] **THE IDENTITY OF CRAFT PRODUCTION IN EARLY URBAN SOCIETIES AND THE CULTURALLY SPECIFIC DEFINITION OF PUBLIC SPACE**

Craft specialization, as expressed in functionally segregated areas within settlements, has been intensively studied as a key variable for understanding early state societies. Nonetheless, few attempts have been made to evaluate categories like "workshop" or "atelier." These refer to specific historical

contexts, far from the reality of surveys and excavations, and only partially reflect the set of processes patterning the archaeological record. Production units in early cities can be seen as three-dimensional discrete spaces disposing sediments into outer areas. Once outside, industrial trash interferes with public space, and is subject to different cultural rules. A contemporary steatite-working industry in Pakistan is contrasted with steatite production at the Harappan city Moenjodaro, showing how two similarly specialized urban industries may result in opposite "archaeological" outputs.

Vidale, M. (see Ehrenreich, R. M.) [34]

Villa, Paola (Colorado Museum) and Eric Mahieu (Marseille)

[66] TAPHONOMY AND FRENCH ARCHAEOLOGY

Interest in taphonomic analyses is rapidly growing among French prehistorians and developments in methodology are expected. The meticulous recovery techniques used by French excavators favor a research strategy based on the use of spatial and contextual data as an alternative or a complement to actualistic approaches. As an example, we present a study of human collective burial and refuse pits at Fontbregoua Cave. The purpose of this study is to test criteria for distinguishing breakage due to sediment pressure of dry bones from marrow fracturing of fresh, cannibalized bones.

Villamor, Jose Lorde R. (Philippines)

[31] KALINGA RICE TERRACES

Agricultural terracing develops in four phases: initial terrace formation, expansion, discontinuance, and abandonment. Initial terracing is done by individual households. Terrace expansion highlights the construction of irrigation works by household groups, intervillage cooperation, development of terrace tools from hard wood to iron, institution of regulatory measures on water rights and distribution, clustering of terraces gradually undertaken by the descending generations, and the eventual demise of rice swiddening. Terrace construction discontinues as available water sources are exhausted. Permanent abandonment is caused by erosion lowering the creek floor thereby obstructing the channel to the irrigation canal.

Vogel, J. C. (see Bousman, C. B.) [67]

Voigt, Mary (University Museum-Pennsylvania) [Discussant 59]

Voorhies, Barbara and George H. Michaels (UC-Santa Barbara)

[7] PERIODICITY IN THE FORMATION PROCESSES OF THE SHELL MIDDENS OF THE COASTAL CHIAPAS ARCHAIC

The formation processes of a group of shell middens located within an estuary on the Pacific Coast of Chiapas, Mexico are examined. The middens are sizable accumulations of a single bivalve (*Neocyrena ordinaria* Prime), a marsh clam that is found in shallow lagoons in the vicinity of the sites. Radiocarbon age determinations place the age of the sites during the third millennium B.C., within the late Archaic period of the general Mesoamerican chronology. Thus far, these sites are the earliest known from the coastal plain of Chiapas. We conclude that the sites were used periodically on the basis of the 1) stratigraphy, 2) artifactual assemblages, 3) experiments on cooking and firing clams, and 4) studies of growth rings of archaeological and modern clams.

Vrabel, Deborah (Federal Energy Regulatory Commission) [Discussant 45]

Wagner, D. (see Moseley, M.) [50]

Wagner, Gail E. (Center for American Archaeology)

[57] MISSISSIPPIAN FARMERS OF THE CENTRAL OHIO VALLEY

Paleoethnobotanical interpretations of archaeological remains draws upon techniques and information from other fields and disciplines. In turn, it can provide new viewpoints for directing problem-oriented research. An analysis of the plant remains from late prehistoric groups in the central Ohio Valley is combined with human skeletal, faunal, biochemical, environmental, settlement, and material culture analyses to reveal implications for diet, nutrition and health, social organization, polity decision making, and contact and exchange. Although a case study approach is used, this type of interdisciplinary paleoethnobotanical research is shown to be profitably applicable to a variety of archaeological settings.

Wagner, Mark and Mary R. McCorvie (American Resources Group, Ltd.)

[54] THE "OLD LANDMARK": AN EARLY TO MID-NINETEENTH CENTURY TAVERN ALONG THE SAINT LOUIS-VINCENNES TRACE

During the early nineteenth century the St. Louis-Vincennes Trace connected St. Louis Missouri with the eastern United States. Site 11MR54 in Illinois represents an early tavern along that trace. Samuel Young, a Revolutionary War veteran whose name appears on an 1819 list of "cutthroats and

murderers," lived at the site from 1813-1819. From 1826-1846 Benjamin "Blackbear" Vermillion operated a tavern and stagecoach stop known as the "Old Landmark" at the site. Recent archaeological investigations at 11MR54 uncovered subsurface features including foundation remnants, cellars, and pits containing materials associated with both Young and Vermillion.

Wake, Thomas and Justin Hyland (UC-Berkeley)

[35] EARLY FORMATIVE FLORA, FAUNA, AND ESTUARINE SUBSISTENCE SYSTEMS IN SOUTH COASTAL GUATEMALA

Excellent recovery of flora and fauna from the sites of La Blanca, Department of San Marcos, and of El Mesak, Department of Retalhuleu has provided a new, more detailed view of Early and Middle Formative subsistence systems. The human exploitation of fauna and flora from 1,400 to 700 B.C. is described in this region. This evidence is then used to discuss the broader nature of coastal economies and their evolution in the Formative era.

Waldbauer, R. C. (see Smith, G.) [63]

Walker, P. L. (see Larson, D. O.) [37]

Walters, Gary (Triad Research)

[25] MAYA CEREMONIAL CAVES PROJECT: 1988-1989 FIELD SEASONS

The ultimate goals of the Maya Ceremonial Caves Project are to define the various types of Maya ceremonial cave use in the Toledo District of Southern Belize and to relate them to surface sites manifested in the region. These goals will be accomplished by 1) implementing an extensive, long-term settlement pattern survey and surface collection program to locate cave sites and determine their approximate temporal placement, and 2) undertaking a series of intensive, short-term, site specific mapping, surface collection and excavation programs to clarify, quantify, and elaborate on previously known and collected data within this area. Findings of the 1988 and 1989 field seasons are discussed.

Wapnish, P. (see Hesse, B.) [15]

Waselkov, G. A. (see Sheldon, C. T.) [76]

Wasilewska, Ewa (Utah)

[71] ARCHAEOLOGY OF RELIGION; COLORS AS SYMBOLIC MARKERS DIVIDING SACRED FROM PROFANE

Religious interpretations based on archaeologically recovered material from preliterate societies are often a subjective endeavour. Religion, as an important aspect of human activity and behavior, can be considered in scientific terms when it is approached from a proper, cross-cultural theoretical perspective. A theoretical framework is presented by which the religious data of prehistoric societies, especially of Early Bronze Age Anatolia, can be distinguished, analyzed and interpreted. The importance of colors as signs and symbols of different religions, and their usefulness for archaeological interpretations, is discussed.

Waters, Michael R. (Texas A&M) and Anne I. Woosley (Amerind Foundation, Inc.)

[40] A GEOARCHAEOLOGICAL REEVALUATION OF EARLY COCHISE CULTURE ARTIFACT ASSOCIATIONS WITH PLEISTOCENE LAKE COCHISE, ARIZONA

Geoarchaeological investigations of the lacustrine stratigraphy and geochronology of Pluvial Lake Cochise in southeastern Arizona, show that high stands occurred from 13,750 to 13,400 B.P., once during the early Holocene around 8,900 B.P., and twice during the middle Holocene. Ground stone artifacts of the Sulphur Spring stage of the Cochise Culture, previously reported to be temporally associated with the last Pleistocene high stand of Lake Cochise, are shown to have come from Late Holocene non-lacustrine colluvial sediments. These findings fail to confirm the view that the Sulphur Spring stage was contemporaneous with the Clovis complex. Instead, the Sulphur Spring stage represents the oldest Archaic occupation in the American Southwest, radiocarbon dated between 10,000 and 8,000 B.P.

Waters, M. R. (see Steele, D. G.) [55]

Watson, P. J. (Washington-St. Louis)

[20] OPEN COMMENTS ABOUT ARCHAEOLOGICAL ISSUES CONFRONTING THE 1990'S

Watson, P. J. (see Kennedy, M.) [18]

Wattenmaker, Patricia (Smithsonian)

[46] POLITICAL CENTRALIZATION AND THE REORGANIZATION OF RURAL PRODUCTION

The relationship between political centralization and increasing specialization of the economy is examined through a study of household economic reorganization at the site of Kurban Hoyuk, on the Turkish Euphrates. During the third millennium B.C. Kurban grew from a small village-sized site to a more diversified small town, coincident with regional political centralization. Third millennium B.C. residential structures were excavated to determine the degree of economic specialization at a hinterland site of an early state system. Results of the artifact analyses reveal increasing economic specialization on the non-elite household level as the state society developed. The findings are used to evaluate explanations for increasing specialization of the economy in early state societies.

Watters, David R. (Carnegie Museum of Natural History) and James B. Petersen (Maine-Farmington)

[52] THE FOUNTAIN CAVERN CEREMONIAL SITE, ANGUILLA, WEST INDIES

Archaeological survey and testing, carried out with the Anguilla Archaeological and Historical Society in January 1986, identified 12 well-preserved petroglyphs in Chamber 1, the front part of Fountain Cavern. Two radiocarbon dates (on shell) and analysis of excavated ceramics (29 vessels identified) indicated major use occurred after A.D. 500, during the post-Saladoid era. Attribution of Fountain Cavern to the post-Saladoid is in accord with evidence from open sites that indicate major occupation occurred later on Anguilla than on volcanic islands in the northern Lesser Antilles. Fountain Cavern is interpreted as a ceremonial site used primarily during the post-Saladoid period.

Watters, D. R. (see Donahue, J.) [50]

Weber, David J. (Southern Methodist)

[44] BLOOD OF MARTYRS; BLOOD OF INDIANS: TOWARD A MORE BALANCED VIEW OF SPANISH MISSIONS IN SEVENTEENTH CENTURY NORTH AMERICA

Franciscan missionaries made remarkable progress in planting mission communities in southeastern and southwestern America in the seventeenth century. The classic historical accounts explain this rapid missionary expansion largely from the perspective of the missionaries themselves, crediting them with improving the lot of benighted natives and imagining the mission as an example of "Spain's frontier genius." In the last few decades, historians and anthropologists have challenged that classic construction. They have taken a more balanced view, seeing natives as determining the outcome of Franciscan initiatives and the missions themselves as failures in many respects.

Weber, Steven (Pennsylvania)

[10] ACCOUNTING FOR VARIABILITY IN THE TEMPORAL AND SPATIAL DISTRIBUTION AND OCCURRENCES OF PLANT REMAINS IN SOUTH ASIA SITES DURING THE SECOND AND THIRD MILLENIUM B.C.

The limited archaeobotanical record presently available for South Asia between 2,000 and 4,000 B.C., displays a tremendous amount of temporal and spatial variability. This variability has been attributed to the evolution of region-wide subsistence systems, influence from areas outside South Asia, differing plant-use strategies amongst local populations, and bias in sampling or methods of analysis. South Asian archaeobotanical variability is evaluated in the light of new data, and further suggestions for its interpretation are offered.

Webster, David L. (Pennsylvania State) [Discussant 11]

Webster, D. L. (see Sanders, W. T.) [57]

Webster, Gary (Pennsylvania State)

[34] ELITE MAJORITIES AND THE EMERGENCE OF STRATIFICATION IN PREHISTORIC EUROPE

Prevailing theories on the emergence of social stratification in Bronze Age Europe (e.g., craft specialization/wealth, subsistence/redistribution, social storage and entrepreneurial models), it is argued, are deficient in defining the conditions under which differential control of resources (subsistence, labor, technology) was initially established by an emergent elite. An alternate "elite-majority" model is offered which generates stratification from the structured patron-client relationships resulting from residential shifts within a circumscribed, high risk environmental setting. Implications of the model are discussed with reference to Mediterranean and Temperate European archaeological records.

Wedel, D. L. (see Kornfeld, M.) [54]

Weisler, Marshall (Washington)

[74] TOWARDS DOCUMENTING TRADE AND EXCHANGE IN A COMPLEX CHIEFDOM: AN ESSAY IN METHOD

The spatial and temporal distribution of exotic resources within Polynesian chiefdoms has attracted much recent interest amongst archaeologists analyzing trade and exchange and associated socio-political change. To date, no systematic surveys have been undertaken in Hawai'i expressly for the purpose of finding sources of fine-grained basalt for adze manufacture. A geologic model is presented for locating sources of adze-quality basalt on west Moloka'i, Hawai'i, and an evaluation of the merits of petrographic and chemical characterization of source material is given. The implications for trade and exchange studies of complex societies are discussed.

Weiss, Andrew D. (MASCA-Pennsylvania)

[39] ON THE EDGE OF CASM: COMPUTER ASSISTED SURVEYING AND MAPPING IN THE FIELD

Computer-Assisted Surveying and Mapping (CASM), integrating electronic surveying instruments, field data recorders, and microcomputer graphics, can dramatically increase the speed, accuracy, and cost effectiveness of archaeological spatial data recovery. This paper covers the components and procedures involved in using CASM, along with a review of current applications. The Computer Mapping Program for Archaeological Sites and Survey (COMPASS), a CASM system implemented on the Apple Macintosh, will be described in depth, along with its applications in 1) topographic mapping and systematic surface collection in Thailand, and 2) architectural mapping at a second millennium B.C. mound in Syria.

Weiss, A. D. (see Ciarla, R.) [3]

Weiss, K. M. (see Wood, J.) [57]

Welch, John R. (Arizona @ Fenster School of Southern Arizona)

[53] ARCHAEOLOGY AT THE FENSTER SCHOOL OF SOUTHERN ARIZONA: A REEVALUATION OF THE SABINO CANYON RUIN AND COMMENTS ON 60 YEARS OF PRECOLLEGIATE EDUCATIONAL PROGRAMS

Three generations of contributions to the prehistory of Southern Arizona by the Fenster and Southern Arizona Schools are summarized. Excavations since the 1920's have focused on the Sabino Canyon Ruin (AZ BB:9:32 [ASM]), a Tanque Verde Phase (A.D. 1100-1300) Hohokam site featuring at least four walled compounds. The results of recent resurveys and archival research provide new data for reconstructing the late prehistory of the eastern Tucson Basin. Archaeology has been successfully blended with the Fenster educational experience. Field, laboratory, and classroom programs are being expanded and information and participation from those interested in secondary school archaeological instruction is solicited.

Wells, Peter S. (Minnesota)

[80] CHANGING ATTITUDES TOWARD OBJECTS IN LATE PREHISTORIC EUROPE

Centers of manufacturing characterize the growing economic and social complexity of the final millennium B.C. in Europe. Just before the historical era, around 100 B.C., a profound change took place in the nature of manufacturing. Before that time, workshops produced mostly objects intended for symbolic purposes—to communicate information about status and affiliation. After 100 B.C., centers such as Kelheim and Manching manufactured large quantities of iron tools to serve a wide range of economic purposes, and few goods of primarily symbolic significance. Changes in burial practices further demonstrate a major shift in Europeans' attitudes toward manufactured objects.

Welsh, R. L. (see Terrell, J.) [74]

Whelan, Mary (Iowa), Randall Withrow (Minnesota) and Barbara H. O'Connell (Hamline)

[32] THE BLACK DOG BURIAL SITE, 21-DK-26: EVIDENCE FOR CULTURE CHANGE AT A 19TH CENTURY DAKOTA INDIAN CEMETERY

The Black Dog Burial Site, 21DK26, is an Eastern Dakota Indian burial site dating to the 1840's. It is located on a sandy river terrace above the Minnesota River, roughly seven miles south of St. Paul. Thirty-nine individuals were interred in 25 different burials with a wide variety of artifacts including beads, fire-steels, broaches, knives and scissors. Preliminary analysis reveals clear evidence of the selective integration of non-Indian and Dakota items and customs. Archaeological, osteological and ethnological evidence indicates considerable variation in burial mode, continued use of aerial scaffolds

prior to interment, minimal Christian influence, and significant Dakota modification, substitution and transformation of non-Indian trade items.

White, Christine (Toronto)

[26] CHEMICAL AND TRACE ELEMENT ANALYSES OF HUMAN BONE FROM LAMANAI, BELIZE

Human bone from the lowland Maya site of Lamanai, Belize has been analyzed for the trace elements strontium, magnesium, and zinc for dN15 and dC13 of collagen in order to test the various models of diet over the time range from the Preclassic to Historic periods. Maize consumption as indicated by dC13 and strontium is strongly associated with culture change yet protein consumption as indicated by dN15 remains constant. N15 enrichment in a tomb burial suggests consumption of seafoods by high status males. These results are discussed in light of theories of Maya collapse.

White, John (Youngstown State)

[78] THE SUN SERPENTS: TWO FORT ANCIENT SOLSTICE EFFIGIES

Recent work in Southwestern Ohio in the shadow of the monumental Fort Ancient earthworks has brought to light two large serpent effigies. Constructed of uniformly selected limestone flagstones these effigies, designated Kern Effigy #1 (33WA372) and #2 (33WA373), were radiocarbon-dated to 1200 A.D., the period at which nearby Anderson Village was occupied by prehistoric peoples of the Fort Ancient Aspect. Observations, calculations, and the testing of a series of hypotheses indicates the likelihood that these effigies were utilized as ground markers for designating the summer and winter solstices.

White, Joyce C. (Pennsylvania)

[3] SETTLEMENT PATTERNS OF BAN CHIANG TRADITION SITES IN RELATION TO NATURAL RESOURCES: AN ETHNOECOLOGICAL CONTRIBUTION

The earliest inhabitants of Ban Chiang tradition sites in northeast Thailand, dating from the fourth millennium B.C., were familiar with rice, although not necessarily fully domesticated varieties. Suggestions by some scholars that the early inhabitants selected sites near streams and good rice land are considered too vague to be of predictive value. An ethnoecological study mapped the location of natural resources as currently understood and utilized by local inhabitants of the Ban Chiang area. Other related sites were surveyed relative to their local natural resources. From this study, a relationship between selected natural resources and early village settlement can be hypothesized.

White, J. C. (see Glanzman, W.) [3]

White, Nancy Marie (South Florida)

[7] TESTING REMOTE SHELL MIDDENS IN THE APALACHICOLA VALLEY ESTUARY, NORTHWEST FLORIDA

Clam and oyster shell middens in the lower Apalachicola delta estuary are extremely remote. Sampling strategies are dictated by logistics of access, tides, water tables, etc. Sites may be predominantly freshwater clam (*Rangia*) or oyster or both, also necessitating different methods. Formation processes for different components show similarities in choice of the increasingly higher elevation in these wetlands but differences in resource procurement strategies and material culture. Knowledge of the river's fluvial history and changing channels is essential not only for interpretation of midden formation and range of species present but also for planning future testing.

White, Randall (New York)

[51] VARIATION AND CHANGE IN THE STRUCTURE OF AURIGNACIAN DECORATION AND BODY ORNAMENTATION

A pan European analysis of thousands of Aurignacian body ornaments reveals previously unrecognized patterns of inter-regional, intra-regional and temporal variation that provide new insights into human organization at the beginning of the Upper Paleolithic. Strong regional differences in the form and technology of production of beads and pendants conform well to models of regional stylistic variation. However, there is a puzzling array of site-specific variation, particularly in decorative patterns, that requires explanation. Linkages between body ornaments, exotic raw materials and the first representational art allow the construction of new models to tie together seemingly disparate developments of the basal Upper Paleolithic.

Whitley, T. G. (see Andrews, R. L.) [70]

Wiant, Michael D. (Springfield, Illinois)

[57] REFLECTIONS ON A LONG-TERM REGIONAL ARCHAEOLOGICAL PROGRAM: THIRTY YEARS OF MIDDLE WOODLAND STUDIES IN THE LOWER ILLINOIS VALLEY

In 1988 the Lower Illinois Valley archaeological program marked its third decade. Throughout its history the study of Havana-Hopewell culture has been a hallmark of this program. There have been numerous studies that provide a rich corpus of information ranging from technology to human health. These studies also provide an opportunity to evaluate one example of the development of a program of archaeological research. Focusing on the key concepts of Struever's settlement-subsistence studies, this paper critically reviews the program in terms of its integration, continuity, and contribution toward an understanding of Middle Woodland adaptive strategies.

Wickler, Stephen (Hawaii)

[74] LAPITA EXCHANGE: RECENT EVIDENCE FROM THE NORTHERN SOLOMON ISLANDS, MELANESIA

Research on Buka Island, Papua New Guinea has provided initial evidence for Lapita occupation within the main Solomon Island chain. Lapita pottery and associated stone tools were recovered from two locations on tidal reef flats. Initial analysis suggests a close relationship with material from a reef location on Nissan Island and general stylistic similarities with pottery from the southeast Solomons dating from ca. 2,900-2,500 B.P. Analysis of stylistic, morphological and compositional ceramic attributes and the sourcing of obsidian and ground stone tools is employed to identify the nature and extent of exchange during the Lapita period.

Widmer, Randolph (Houston)

[7] ARCHAEOLOGICAL RESEARCH STRATEGIES IN THE INVESTIGATION OF SHELL-BEARING SITES, A FLORIDA PERSPECTIVE

Archaeologists traditionally classify most shell-bearing sites as shell middens leading to severe misidentification and misinterpretation of function of many sites. Shell-bearing sites can be formed by many different formation processes. The failure to recognize and distinguish these formation processes has resulted in misinterpretation of site function and failure to recover numerous classes of data caused by inadequate excavation strategy. Research strategies and excavation tactics, drawn from work on numerous shell-bearing sites in Florida, are presented which will permit the collection of data to identify the formation processes responsible for the depositional history of sites, their function, and the potential features which might be present.

Wilhelmsen, Kris H. (Washington)

[17] SPATIAL ANALYSIS AND FORMATION PROCESSES: PROBLEMS WITH THE CURRENT AFFAIR

Processes that contribute to the formation of the archaeological record must be deduced from physical characteristics of a deposit. Spatial analysis, used in achieving this goal, creates a contextual framework for interpretation. This method includes locational analysis but also extends to documentation of the formal properties of objects and deposits containing them. It is demonstrated that the growth of knowledge regarding the evolution of an archaeological deposit is inhibited by: 1) failure to create units that facilitate the systematization of archaeological phenomena, 2) reification of analytic units in behavioral terms, and 3) lack of an archaeologically relevant body of spatial-analytic theory.

Will, Elizabeth Lyding (Massachusetts)

[29] PRODUCTION AND DISTRIBUTION OF ROMAN AMPHORAS

Ceramic production and distribution systems were closely interrelated during the Roman Period. Shipping amphoras are the most frequent ceramic finds at Roman land and underwater sites. They were produced by techniques similar to modern mass production, in factories located close to seaports or to river ports. From such export facilities, the filled amphoras were shipped in large numbers, over well defined routes, to their destinations throughout the Roman world. Production and distribution centered in different parts of the Roman world at different periods and were sometimes controlled by private individuals and sometimes subject to rigid governmental regulations.

Willey, P. (see Snyder, L. M.) [55]

Williams, Mark (Lamar Institute)

[36] CHIEFLY COMPOUNDS

Many small scale Lamar mound sites are under three hectares in size. They have been variously represented as towns, villages, and ceremonial or administrative centers. Most researchers assume that the chief and common people lived at such sites. Ethnologists in Africa and South America have used the phrases "chiefly compound" or "court" to describe small habitations where a chief resided with

his wives, children, relatives, slaves, and attendants—often over 100 people—all in their own houses within a palisade. Common people were excluded, however. Many small Lamar mound sites in the South Appalachian area likely conformed to this pattern.

Williamson, Ray A. (Office of Technology Assessment (U.S. Congress)) and Fred Blackburn (White Mesa Institute)

[33] APPROACHES TO CURBING VANDALISM AND POT HUNTING OF ARCHAEOLOGICAL RESOURCES

Vandalism and pot hunting are taking an increasing toll on U.S. archaeological resources on both public and private land. A variety of techniques are examined that have been employed for curbing such activities and assessing their efficacy. Also discussed is the role of avocational archaeologists and other interested laymen in protecting and preserving these resources. In particular, an integrated educational and research program is described that involves professionals from several disciplines in the vast "Outdoor Museum" of the Southwest. Many of these methods can be implemented in other regions of the United States.

Williamson, R. A. (see Ambruster, C.) [78]

Williamson, Ronald F. (Archaeological Services Inc.) and William A. Fox (Ministry of Culture and Communications-Canada)

[19] BROWSING ON MEADOWOOD BLADES: AN INVESTIGATION OF REGIONAL EXCHANGE AND PRODUCTION SYSTEMS

Macro-regional uniformity of Meadowood Blades across southern Ontario is certainly evident, although attribute analyses of geographically separated assemblages suggest that interactions of attributes may correlate with skill of individual knappers or subtle differences in reduction activities. The reasons for these differences may be strictly technological, or they may be intended in a symbolic-informational sense for other members of the society. Indeed, they may simply represent subtle expressions of micro-regional ethnicity. Subsequent widespread distribution of Ohio Flint Ridge bifaces appears to signal both a breakdown in classic Meadowood technology and transition to more complex socio-political allegiances.

Willoughby, Pamela (Alberta)

[81] THE NATURE OF VARIATION WITHIN THE AFRICAN ACHEULEAN

Throughout the history of their research, Paleolithic archaeologists have consciously or unconsciously made use of models from paleontology. This has colored their interpretation of technological change. Despite this, a case can still be made that the tempo as well as mode of Paleolithic change parallels the coeval trends in hominid speciation and evolution. Questions of the nature of such change are reviewed using the African Acheulean as a model. The Acheulean represents a period of over a million years duration with little variation over time and space. Ways to measure and interpret this variation are also outlined.

Wilson, Robert C. (National Park Service-Southeast Archaeological Center) and Thomas DesJern
(NPS-Big South Fork National River and Recreation Area)

[33] VANDALISM BEHAVIOR IN THE SOUTHEAST NATIONAL PARKS-DIAGNOSES AND TREATMENTS

Over the past several years the Southeast Archaeological Center has been collecting data on vandalism of archaeological resources within the Southeast National Parks. A major monitoring program, funded by the Nashville District, U.S. Army Corps of Engineers at the Big South Fork National Park and Recreation Area, has resulted in identifying a number of behavioral characteristics of vandals for this area. This program, together with the need to monitor and record site conditions in the parks, has resulted in the development of several pilot training programs and park archaeological protection plans.

Winslow, Margaret Anne (City College of CUNY)

[50] MODELING PALEOSHORELINES AT TECTONICALLY ACTIVE MARGINS

The spatial distribution of coastal archaeological site heights and ages in tectonically active regions reveals a complex puzzle requiring eustatic and isostatic corrections, as well as an understanding of uplift/subsidence rates for its solution. Early Holocene paleoshoreline data and initial occupation ages from coastal habitats require both eustatic and isostatic corrections in order to identify patterns of uplift, tilting or subsidence. Modeling of uplifted marine terrace and archaeological data from the Shumagin Islands of Alaska reveals systematic patterns of differential uplift which define tilting fault blocks. Paleoshoreline analyses can be used to predict paleo-harbor geometrics and the maximum expected age of a site in a given location.

Winter, Joseph (New Mexico) [Discussant 78]

Winter, M. C. (see Joyce, A.) [69]

Wise, Karen (Northwestern)

[6] LATE INTERMEDIATE PERIOD DOMESTIC ARCHITECTURE OF LUKURMATA

The archaeology of households and domestic compounds provides important data on ethnic and social groupings as well as economy. Excavations at the North Point area of the site of Lukurmata, Bolivia, provide rare data on Late Intermediate Period domestic architecture in the southern Titicaca basin. Architectural features represent a domestic compound located directly on the shores of Lake Titicaca, and subsistence remains indicate fish processing was the major activity at this site. Analysis suggests that these features represent a long sequence of a lacustrine economy. It is suggested that the evidence at North Point represents a local ethnic group which maintained an economic focus on lake exploitation.

Wiseman, F. (see Pohl, M.) [26]

Withrow, Barbara (Minnesota)

[74] PREHISTORIC PRODUCTION, DISTRIBUTION, AND USE OF STONE ADZES: IMPLICATIONS FOR THE DEVELOPMENT OF HAWAIIAN CHIEFDOMS

The role of adze stone procurement and adze distribution in prehistoric Hawaiian chiefdoms is assessed and used to reevaluate earlier theories such as those of Sahlins, Service, and Earle concerning the role of the exchange of material resources in the development of complex societies. Petrographic analysis is used to identify adze sources. Metrical data on stone adzes from the Island of Hawaii are also used to test hypotheses which correlate changes in adze production, distribution, and use with changes in Hawaiian craft specialization, political centralization, and social stratification.

Withrow, R. (see Whelan, M.) [32]

Witschey, Walter R.T. (Tulane)

[25] RECENT INVESTIGATIONS AT THE INLAND MAYA PORT CITY OF MUYIL, QUINTANA ROO, MEXICO

During 1987 and 1988, I directed two field seasons of research at the Maya site of Muyil, 25 kilometers south of Tulum in Quintana Roo Mexico. Results thus far document a large site (130 h) of long occupation (Late Preclassic through Late Postclassic). Survey and reconnaissance have revealed new small sites in the region, an internal *sacbe* system leading to a seaport, several architectural alignments of civic and ceremonial architecture and several residential architectural forms, many with extensive field walls. Usual features of the *sacbe* system suggest that inhabitants adapted port facilities to changing water levels.

Wolforth, Lynne Mackin (Illinois)

[48] COMPUTER SIMULATION OF INFECTIOUS DISEASE DIFFUSION IN PROTOHISTORIC POPULATIONS

A computer simulation of the diffusion of infectious disease in Native American populations is described. Modeled on a nineteenth century Missouri River smallpox epidemic, this simulation pays particular attention to Native American demographic variables. These include: interaction between the sexes, household structures, site size and density, distance between sites, Native American modes of transportation and migration patterns. The values of simulation variables are changed to reflect a variety of protohistoric patterns and a range of disease parameters. The size and duration of simulated epidemics are reported with the objective of predicting infectious disease diffusion in protohistoric populations.

Wood, James, Henry C. Harpending, George R. Milner and Kenneth M. Weiss (Pennsylvania State)

[57] THE OSTEOLOGICAL PARADOX: LINKING MORTALITY AND MORBIDITY IN SKELETAL POPULATIONS

The salient characteristic of skeletal samples is severe selectivity: we observe individuals who died at each age, not all those at risk of dying. Consequently, inferring population prevalences from skeletal lesions is difficult at best. Hazards models of heterogeneous populations composed of subgroups with different distributions of "frailty" display surprisingly different patterns of age-specific mortality. These models are employed to explore the linkage between pathological conditions and the risk of death in an Illinois skeletal series, and to illustrate the effects of underlying frailty distributions and the selectivity inherent in mortality samples.

Woodall, J. Ned (Wake Forest)

[63] SOPA AND NARTS: ACRONYMS WITHOUT ACRIMONY FOR THE 1990'S

The wise conservation of archaeological resources is, as always, determined by the available legal and fiscal tools, and the capabilities and objectives of archaeologists. In regard to the latter, two trends hold promise for the 1990's and beyond. The dramatic increase in archaeologists seeking certification by the Society for Professional Archaeologists (SOPA) and the creation of national and state research objectives to focus significance evaluations and data recovery programs.

Woodbury, Nathalie F.S. (Anthropology Newsletter) [Discussant 58]

Woodman, James (Northern Arizona)

[53] TOWARD AN UNDERSTANDING OF PREHISTORIC POLITICAL COMPLEXITY IN CENTRAL ARIZONA: AN EXAMPLE FROM FOURMILE RUIN

Fourmile ruin is a large aggregated site of some 500 rooms located two miles east of Taylor, Arizona. The core area of the site was occupied during the late 13th through the late 14th centuries. I attempt to contribute to the forum concerning levels of political complexity at large Pueblo IV sites in east-central Arizona, such as Grasshopper and Chavez Pass. This is accomplished by reconstructing the Fourmile building sequence through the use of wall abutment analysis and ceramic distributions within the site from both surface collections and selective testing. Another focus is on the small dispersed sites in the area and their temporal relations to Fourmile gleaned through a survey of the surrounding area. It is hoped that these two methods will shed light on the sequence of aggregation and subsequent inferences regarding internal complexity at this site.

Woods, William I. and Neal H. Lopinot (Southern Illinois-Edwardsville)

[60] DYNAMIC PATTERNS OF FOOD PRODUCTION AT CAHOKIA

A dynamic model for aboriginal cropping practices has been developed for the Mississippian Cahokia settlement. The model is based on the variable distribution of soil properties and on hydrologic and terrain conditions, considered in conjunction with the requirements and relative proportions of identified cultigens. Various aspects of the Cahokia site and its catchment suggest that very intense and diverse food producing strategies were practiced. Changing patterns of monocropping and polycropping, involving communal outfields and household gardens, are projected.

Woodworth, R. (see Blakely, R. L.) [19]

Wosley, Anne I. (Amerind Foundation, Inc.) and Bart Olinger (Los Alamos National Laboratory)

[14] THE CASAS GRANDE CERAMIC TRADITION: PRODUCTION AND INTERREGIONAL EXCHANGE OF RAMOS POLYCHROME

Ramos Polychrome occurs across northern Mexico and the southern Southwest. Accounting for the greatest number of vessels and sherds of any painted ware from Casas Grandes, it was produced for domestic consumption and trade. To determine its chemical signature, several hundred sherds from Chihuahua, Arizona, and New Mexico contexts were analyzed using X-ray fluorescence. XRF analysis addressed: 1) the heterogeneity or homogeneity of Ramos Polychrome, 2) the distribution of ceramics directly attributable to a Casas Grandes origin, 3) if Casas Grandes was the major production center. These issues have import for the placement of Casas Grandes within a regional ceramic trade network.

Wosley, A. I. (see Waters, M. R.) [40]

Worth, J. (see Hudson, C.) [1]

Wright, Henry (Michigan) [Discussant 72]

Wright, Melanie (Minnesota)

[80] IMPORTS AND CONSTRUCTION OF CULTURAL IDENTITY

Manufactured objects are not passive reflections of cultural reality but are actively involved in constructing it. Social meanings of objects are highlighted when they are involved in cross-cultural trade. This paper contrasts the uses of Mediterranean imports at early Iron Age Heuneberg and at Durrnberg bei Hallein. At the former, evidence suggests a wholesale, direct adoption of Mediterranean objects and behaviors (among the elites), where at the latter, incorporation of foreign items was more selective and transformational. This difference is explained in terms of different constructions of social identity required by an agricultural center (Heuneberg) versus a mining center (Durrnberg).

Wurtzburg, Susan (SUNY-Albany)

[21] LITHIC ANALYSES AND RESIDENTIAL PATTERNS: SAYIL, MEXICO

During the Spring of 1988, lithics were collected from selected residential platforms at Sayil, Yucatan, Mexico. A combination of attribute analysis and compositional analysis is used to describe this lithic

data base. Such an approach allows for the preliminary interpretation of residentially derived patterning within the community.

Wylie, M. Alison (Western Ontario)

[18] GENDER THEORY AND THE ARCHAEOLOGICAL RECORD: WHY IS THERE NO ARCHAEOLOGY OF GENDER?

This paper is concerned with 1) why there is no counterpart in archaeology to the vibrant traditions of research on women and gender that are well-established in most other social science fields? and 2) what are the prospects, at this juncture, for the development of an archaeology of gender? To address these questions I consider the methodological arguments, the nature of androcentric research, feminist stand-point theory, and post-modern critiques. And I discuss why I can conclude that the prospects for the development of an archaeology of gender in the late 1980's are very good.

Wymer, Dee Ann (Licking County Archaeology and Landmarks Society)

[5] TRENDS AND DISPARITIES: THE WOODLAND PALEOETHNOBOTANICAL RECORD OF THE MID-OHIO VALLEY

Recent projects in Ohio, West Virginia, and Kentucky have yielded a rich and diverse archaeobotanical assemblage for the Woodland period. Subsistence and environmental changes are explored from Early to Late Woodland, revealing broad intraregional trends with subtle, possibly significant, differences evident. The data are also used to examine distinctions between ceremonial and habitation contexts.

Wynn, Jack T. (USFS-Georgia)

[27] MISSISSIPPIAN PERIOD ARCHAEOLOGY IN THE GEORGIA BLUE RIDGE MOUNTAINS

A brief summary of archaeological investigations of the Mississippian Period in the Georgia Blue Ridge is given, with recommendations for future research and cultural resources management directions. Past research there has included a few early excavations, Wauchope's WPA survey, and recent Appalachian Highway and U.S. Forest Service surveys. These mostly concentrated on river bottom mound sites. Forest Service and other compliance surveys have found few upland Mississippian sites. Bottomland agricultural village and mound center occupants apparently used mountains for hunting and gathering of biological and mineral resources, but seldom lived there. This contrasts markedly with the upland Georgia Piedmont, which was heavily occupied.

Yeatsch, Anne and Conrad M. Goodwin (New Jersey State Museum)

[16] DEFINING MORVEN'S ARCHAEOLOGICAL GARDEN LANDSCAPE

For the past two years, the New Jersey State Museum has been conducting research at Morven, in Princeton, New Jersey, to locate the remains of a four and one-half acre eighteenth century ornamental garden and its associated working farm. Its imprint on the land will define the framework for reconstruction and restoration. This paper focuses on a pragmatic approach to the excavation of large areas with fine-grained soil stratigraphy and complex features to recover information about the garden. This in turn is integrated with archaeobotanical data and household data to produce both an archaeological description and an ethnographic context for the garden.

Yerkes, Richard W. (Ohio State) and John Nass, Jr. (Archaeological Services Consultants)

[36] SOCIAL DIFFERENTIATION IN MISSISSIPPIAN AND FORT ANCIENT SOCIETIES

Evidence for social differentiation is examined in examples of Cahokia Mississippian and Ohio Fort Ancient households from several types of domestic sites. Patterns of settlement organization, household size, storage facilities, and artifact assemblages are compared and contrasted. Factors other than social differentiation that may account for the variability in these attributes are considered, and the value of each attribute as an index of social differentiation is weighed.

Zarins, Juris (Southwestern Missouri State)

[72] ARABIAN-AFRICAN CONTACTS ACROSS THE SOUTHERN RED SEA

Analysis of obsidian from archaeological sites on both sides of the southern Red Sea has revealed approximately 60 definable obsidian sources. Utilizing standard chemical and trace element techniques, this study indicates that exchange and other forms of contact across the Red Sea began around 5,000 B.C. In addition to this network of obsidian exchange, there is some suggestion that this trade pattern is part of a larger interaction sphere, involving East Africa, southern Arabia and India, that accommodated flows of various exotica including flint, resins, and semi-precious stones.

Zeanah, David William (Utah)

[52] DIET BREADTH AND THE ADOPTION OF HORTICULTURE IN THE EASTERN UNITED STATES

An Inverse correlation between walnuts and indigenous cultigens during the Woodland period is examined using the diet breadth model. The model predicts that greater abundance of resources with high caloric returns may result in the exclusion of lower return resources from diet breadth. Walnuts provide lower caloric returns than cultigens like sunflower, sumpweed, and goosefoot. Lower representation of walnuts coincident with increased cultigens in the archaeological record is consistent with the hypothesis that greater reliance on horticulture resulted in the exclusion of walnuts from Woodland diets. The hypothesis is tested against the archaeological records of four regions in the Southeast.

Zechenter, Elzbieta (UCLA)

[28] SUBSISTENCE CHANGES IN COASTAL PERU DURING THE SECOND AND THIRD MILLENNIA B.C.

The Cotton Preceramic period in coastal Peru has long been described in terms of a maritime subsistence economy. Based on recent archaeological, ecological, and geomorphological fieldwork conducted in the Supe Valley of Peru, this paper introduces a series of models which use the formal logic of *integer programs*. The models are implemented for several scenarios to investigate the subsistence behavior of the populations inhabiting the Supe Valley during different phases of the Preceramic and Initial periods. The importance and feasibility of marine versus terrestrial diet in the Supe Valley is evaluated. The results produced by the models lead to a reinterpretation of the subsistence behavior of coastal societies and provide a new sequence of economic changes during the Preceramic and Initial periods. The paper also demonstrates how integer programming allows for greater generality in analyzing resource use than the existing methods.

Zeder, Melinda (Smithsonian) and Elizabeth Myler (American)

[59] ANIMAL UTILIZATION AT UMM QSEIR

Recent findings from northern Mesopotamia indicate that the fifth millennium subsistence economies display greater flexibility than traditionally expected. Halaf pioneers at Umm Qseir took advantage of "game park conditions" of the Middle Khabur, exploiting steppic gazelle and onager as well as riverine game while using prolific domestic pigs as insurance against the eventuality of poor hunting. Caprids were exploited for secondary products and for meat. The persistence of wild game in the late Uruk indicates that opportunities for hunting continued into the fourth millennium, but the focus on larger steppic game and the abandonment of swine herding point to a basic change from the Halaf in the nature of the late Uruk occupation.

Zeidler, James (Pittsburgh)

[73] TOWARDS A REGIONAL CHRONOLOGY FOR NORTHERN MANABI PROVINCE, ECUADOR: CHRONO-STRATIGRAPHIC EVIDENCE FROM THE JAMA RIVER DRAINAGE

Although well-known as the territory of Ecuador's Jama-Coaque Culture, a complex prehispanic chiefdom spanning some 2,000 years, northern Manabi Province is perhaps the least studied sector of coastal Ecuador, having a very poorly documented cultural chronology. Recent archaeological research centered in the Jama River drainage addresses this problem. Radiometric assays, tephro-chronological evidence, and ceramic data are marshalled from stratified sites in the middle and lower reaches of the drainage as a means of documenting a valley-wide sequence of cultural occupation, with special emphasis given to the large ceremonial center of San Isidro.

Ziegler, Joanna E. (College of the Holy Cross)

[80] THE MEDIEVAL PIETA: SCULPTURE OR FETISH?

The meaning of northern Pietas, the most popular later medieval religious theme, are redefined as objects of material culture. Returning to 16th century Iconoclastic writings and analyzing production history as well as material characteristics, I suggest that in the medieval context Pietas were used as fetishes or idols, not as displays of luxury or as precious works of art. Pietas encouraged an intensely private and literally empathic viewer response (because of its physical and tactile nature) to Christ and Mary—Pietas therefore were personally useful objects that may be employed as crucial social indices of religious attitudes and practices among ordinary people.

Zimmerman, Laurie and D. Gentry Steele (Texas A&M)

[43] DIETARY RECONSTRUCTION OF HUNTER-GATHERERS OF THE EASTERN MARGIN OF THE TAMAULIPAN BIOTIC PROVINCE

Analyses of vertebrate and invertebrate remains from fourteen Late Archaic to Late Prehistoric hunter-gatherer sites located along the eastern margin of the Tamaulipan Province represent the first

dietary synthesis based upon an extensive inventory of sites of the region. The aboriginal populations in this area utilized a variety of terrestrial and aquatic food resources consisting of more than eighty genera. Comparison of the fourteen sites documents similar patterns of subsistence, the variety of fauna selected, the consistency regarding utilization of the diverse fauna throughout the area, and shifts in diet through time.

Zubrow, Ezra (SUNY-Buffalo)

[29] THE ARCHAEOLOGICAL IMPLICATIONS FOR CERAMICS OF FORMAL PRODUCTION AND DISTRIBUTION MODELS

Formal economic models demonstrate the relationship among the quantities of available inputs—labor, clay, wood—and the quantity of ceramic output. Distribution models predict who are the consumers. Fixed and variable inputs in the short and long term are examined in order to create long-run production functions. For household ceramic producers diseconomies rapidly outweigh economies of scale resulting in the transition to specialized ceramic shops. Analogously, the inelasticity of household demand is mathematically shown to result through distribution models in the development of ceramic traders. Ethnoarchaeological evidence is used to estimate the actual parameters of the models.

Zuidema, R. T. (Illinois)

[78] THE PILLARS OF CUZCO: THE CALENDRIAL AND ASTRONOMICAL SIGNIFICANCE

The most important device in Incaic astronomy, used for calibrating the calendar, was a set of four pillars on the horizon of Cuzco, by which sunset was observed. Earlier, I argued that sunset between the central pillars occurred on 2 September and helped define the synodic and sidereal lunar month around the following equinox. Here, I analyze the calendrical and ritual significance of the date, 10 April, when the sun set there again. This date has no apparent lunar associations. I also present data that could be used to discover the original placement of the *ushnu* from which the pillars were observed.

Zvelebil, M. (see Green, S.) [9]

ABSTRACTS OF POSTERS

Ausec, Marne (Albion) and Patricia A. Urban (Kenyon)
DIFFERENTIAL DISTRIBUTIONS OF DESIGN ELEMENTS OF LATE CLASSIC PAINTED AND INCISED POTTERY FROM THE NACO VALLEY, NORTHWESTERN HONDURAS

Design elements were studied on three classes of Late Classic Pottery: Conejo Bichrome, Conejo (red on orange) and Mono (black on orange) varieties; Chamelecon Polychrome (three varieties), a red and black on orange ware with affinities to Gualpola Polychrome; and several types within the Masica system of incised and red-painted vessels. Individual elements and combinations of elements were unevenly distributed within the region, and within the major center of La Sierra. These differences may mark regional social groups, or status differences with certain designs restricted to the La Sierra elite. To date, distributions of other artifact categories support the second hypothesis.

Babcock, R. S. (see Stone, J.)

Brennan, C. (see Fish, S.)

Eddy, Frank W. and Dale Lightfoot (Colorado)
REMOTE SENSING OF GLAZE PERIOD TOWNS IN THE GALISTEO BASIN, NORTHERN NEW MEXICO

Two kinds of infrared data were flown in late summer of 1987 by the Stennis Space Center of NASA in flight lines that intersected archaeological ruins of the Galisteo Basin, northern New Mexico. Simultaneous collection of both Thermal Infrared images and Color Infrared Photography (CIR) were made over four large prehistoric towns including: San Marcos, San Lazaro, Colorado and San Cristobal Pueblos. The flight lines recorded both the interior layout of the central place towns as well as information on surrounding villages and farm fields. Elements of the town-size settlements are clearly revealed including: room blocks, plazas, gates, shrines and reservoirs. Using the remote sensing data, maps were prepared for field checking carried out during the summer of 1988. The transect coverage allows analysis of settlement networking and the dynamics of Glaze Period communities. Moreover, in the computer enhancements of the digital sensor data, ruins show differential thermal emissivity. The CIR photography also is useful in constructing base maps, stereo-viewing of relief and identifying pebble mulched fields.

Ellis, G. Lain and Michael R. Waters (Texas A&M)
THE GEOARCHAEOLOGY OF PLACE: AN EXAMPLE FROM THE TUCSON BASIN, ARIZONA

Prehistoric landscapes are key elements in settlement pattern analysis. From A.D. 800-1450, Hohokam settlement along the San Xavier reach of the Santa Cruz River in the Tucson Basin is a function of distance from the floodplain. Diachronic variation in settlement pattern during this period, however, is partially a function of nearness to previous settlements, and partially a function of adjustment to changing landscape elements on the floodplain (e.g., channel entrenchment and filling, and sand dune, cienega and arroyo fan formation). The geoarchaeology of place, therefore, has the potential to help differentiate between possible cultural and geomorphic determinants of settlement.

Fish, P. R. (see Fish, S.)

Fish, Suzanne, Paul R. Fish (Arizona State Museum), Curtiss Brennan (Arizona) and John Madsen (Arizona State Museum)
INTEGRATION AND STRUCTURE OF A NONRIVERINE HOHOKAM CLASSIC PERIOD COMMUNITY

In the northern Tucson Basin of southern Arizona, two earlier settlement clusters coalesced in the early Classic Period to form a single multi-site community covering 146 square kilometers. A platform mound site was centrally located within this integrated complex spanning basin floor to mountain flanks. Regional survey, mapping and excavation at both community and site levels have produced quantified distributions for horizontal and vertical differentiation. Levels of productive specialization and some consumptive patterns have been demonstrated that are commensurate with a strong network of exchange.

Kane, Sonya and Patricia A. Urban (Kenyon)
FORM AND STRUCTURE AT A TERMINAL POSTCLASSIC SITE IN NORTHWESTERN HONDURAS

In 1988 a routine survey of terraces on the north bank of the Rio Chamelecon, northwestern Honduras, located a previously unknown Terminal Postclassic site. Brisas has 185 surface-visible constructions, about one-third looted or otherwise damaged, but no modern structures obscure the site.

Weymouth, John

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Excavation revealed non-structural activity loci, the form and construction of elite and non-elite residences, and the presence of two round structures with talud-tablero-like architecture, one of which supported a monument in the form of an owl. Artifacts are congruent with contemporary materials from Postclassic Naco, some 7.5 kilometers to the southwest.

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Stone, Jane, Laurie J. Reinhart, J. Denbigh Starkey and Ray S. Babcock (Montana State)
COMPUTERIZED THREE-DIMENSIONAL MODELING OF STRATIGRAPHY: ADVANTAGES, PITFALLS, AND DATA REQUIREMENTS

Computerized three-dimensional modeling enhances our interpretive capabilities by allowing efficient visualization and presentation of the internal structure of a deposit, depositional history, and point-in-time reconstructions. A new algorithm for three-dimensional modeling allows generation of the model directly from strata maps with exceptional resolution and color manipulation, 360 degree rotation with appropriate lighting/shading, and the ability to extract specific features and/or structures. Visual realism is achieved using semi-transparency and smooth surfaces, unlike previous computer methods. Some current field recording practices are inadequate for three-dimensional modeling. New field data standards are suggested. Examples from two sites are presented.

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Magnetic surveys are sometimes conducted using a gradiometer consisting of a vertical pair of magnetometer sensors. This configuration eliminates diurnal changes and long range trends. If the data from the two sensors are separately used, additional information is available. Possibly significant longer-range patterning can be seen and estimates of anomaly source depth can be made. In fact, the gradiometer results can be approximated by filtering single-sensor data. These points will be discussed and comparisons made with excavation results using two sets of magnetic and excavated data from a Mississippian site (23SH11) in Missouri.

ABSTRACTS OF POSTERS

Ausec, Marne (Albion) and Patricia A. Urban (Kenyon)
DIFFERENTIAL DISTRIBUTIONS OF DESIGN ELEMENTS OF LATE CLASSIC PAINTED AND INCISED POTTERY FROM THE NACO VALLEY, NORTHWESTERN HONDURAS

Design elements were studied on three classes of Late Classic Pottery: Conejo Bichrome, Conejo (red on orange) and Mono (black on orange) varieties; Chamelecon Polychrome (three varieties), a red and black on orange ware with affinities to Gualpopa Polychrome; and several types within the Masica system of incised and red-painted vessels. Individual elements and combinations of elements were unevenly distributed within the region, and within the major center of La Sierra. These differences may mark regional social groups, or status differences with certain designs restricted to the La Sierra elite. To date, distributions of other artifact categories support the second hypothesis.

Babcock, R. S. (see Stone, J.)

Brennan, C. (see Fish, S.)

Eddy, Frank W. and Dale Lightfoot (Colorado)
REMOTE SENSING OF GLAZE PERIOD TOWNS IN THE GALISTEO BASIN, NORTHERN NEW MEXICO

Two kinds of infrared data were flown in late summer of 1987 by the Stennis Space Center of NASA in flight lines that intersected archaeological ruins of the Galisteo Basin, northern New Mexico. Simultaneous collection of both Thermal Infrared images and Color Infrared Photography (CIR) were made over four large prehistoric towns including: San Marcos, San Lazaro, Colorado and San Cristobal Pueblos. The flight lines recorded both the interior layout of the central place towns as well as information on surrounding villages and farm fields. Elements of the town-size settlements are clearly revealed including: room blocks, plazas, gates, shrines and reservoirs. Using the remote sensing data, maps were prepared for field checking carried out during the summer of 1988. The transect coverage allows analysis of settlement networking and the dynamics of Glaze Period communities. Moreover, in the computer enhancements of the digital sensor data, ruins show differential thermal emissivity. The CIR photography also is useful in constructing base maps, stereo-viewing of relief and identifying pebble mulched fields.

Ellis, G. Lain and Michael R. Waters (Texas A&M)
THE GEOARCHAEOLOGY OF PLACE: AN EXAMPLE FROM THE TUCSON BASIN, ARIZONA

Prehistoric landscapes are key elements in settlement pattern analysis. From A.D. 800-1450, Hohokam settlement along the San Xavier reach of the Santa Cruz River in the Tucson Basin is a function of distance from the floodplain. Diachronic variation in settlement pattern during this period, however, is partially a function of nearness to previous settlements, and partially a function of adjustment to changing landscape elements on the floodplain (e.g., channel entrenchment and filling, and sand dune, cienega and arroyo fan formation). The geoarchaeology of place, therefore, has the potential to help differentiate between possible cultural and geomorphic determinants of settlement.

Fish, P. R. (see Fish, S.)

Fish, Suzanne, Paul R. Fish (Arizona State Museum), Curtiss Brennan (Arizona) and John Madsen (Arizona State Museum)
INTEGRATION AND STRUCTURE OF A NONRIVERINE HOHOKAM CLASSIC PERIOD COMMUNITY

In the northern Tucson Basin of southern Arizona, two earlier settlement clusters coalesced in the early Classic Period to form a single multi-site community covering 146 square kilometers. A platform mound site was centrally located within this integrated complex spanning basin floor to mountain flanks. Regional survey, mapping and excavation at both community and site levels have produced quantified distributions for horizontal and vertical differentiation. Levels of productive specialization and some consumptive patterns have been demonstrated that are commensurate with a strong network of exchange.

Kane, Sonya and Patricia A. Urban (Kenyon)
FORM AND STRUCTURE AT A TERMINAL POSTCLASSIC SITE IN NORTHWESTERN HONDURAS

In 1988 a routine survey of terraces on the north bank of the Rio Chamelecon, northwestern Honduras, located a previously unknown Terminal Postclassic site. Brisas has 185 surface-visible constructions, about one-third looted or otherwise damaged, but no modern structures obscure the site.

Weymouth, John

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