

MARQUARDT

Program and Abstracts



SOCIETY FOR
AMERICAN ARCHAEOLOGY

FORTY-SEVENTH ANNUAL MEETING

Minneapolis, Minnesota

April 14-17, 1982

DEKIN -
Binghamton
temp for 1 year

Forty-Seventh Annual Meeting

SOCIETY FOR AMERICAN ARCHAEOLOGY

Program Chair: Payson D Sheets
Program Assistants: Roberta Klausung
Debbie Tyler

OFFICERS

OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY

President: Richard E W Adams
President-elect: George Frison
Secretary: Leslie E Wildesen
Treasurer: W James Judge
Editor: Dena Dincauze
Executive Committee Members: Albert Goodyear and Linda Cordell (to 1982) Robert Whallon and John Speth (to 1983)

GENERAL INFORMATION

Abstracts - Abstracts of papers presented at this meeting are included in the program. Additional copies are available for 25¢ per copy and may be ordered from the Society for American Archaeology, 1000 North Dearborn Street, Chicago, Illinois 60610.

PROGRAM AND ABSTRACTS of the Forty-Seventh Annual Meeting Minneapolis, Minnesota

April 14-17, 1982

Directory of Meeting Rooms - Main Lobby Level: Midway, Iowa, Minnesota, Wisconsin, Iowa, Illinois - Second Floor: Hoover, Wisconsin, Iowa, Minnesota, Illinois, Jefferson, Adams, Washington - Street Level: New York, Pennsylvania, Chicago (all sessions at the Livingstone).

Exhibits - Exhibitors' book exhibits will be displayed in the Jolly Day Room from 9:00 a.m. to 5:00 p.m. on Wednesday, Thursday and Friday, and 9 a.m. to 4 p.m. on Saturday. To reach the message center, call the Livingstone main number 612-328-1122 and ask for the SAA Postage center.

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Open House - Everyone is invited to an open reception (refreshments) on Thursday at 5:30 pm in the Iowa Room.

New Member Reception - Officers of the Society will hold a reception for all SAA members and for members attending their first annual meeting on Friday at 5 pm in the Lincoln Room.

Placement Service - A placement service will be conducted in the New York Room from 9 am to 5 pm on Wednesday and from 9 am to 5 pm on Thursday and Friday, 9 am to 5 pm on Saturday. Placements open to working archaeologists will be available throughout the meeting. Member resumes will be provided to those members who are assigned for use in the placement service.

Registration - Registration in which attendance at the program and Abstracts is required for attendance at all sessions. Registration cards will be open on the lobby level from 9 am to 5 pm on Wednesday, and from 9 am to 5 pm on Thursday and Friday, and 9 am to noon on Saturday. Members who preregistered by April 1 should claim their badges and programs at the audience registration desk.

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

GENERAL INFORMATION

Abstracts Abstracts of papers presented at this meeting are included in the *Program*. Additional copies are available for \$5.00 per copy and may be ordered prepaid from the Society, 1703 New Hampshire Avenue, NW, Washington, DC 20009.

Business Meeting The Society's annual business meeting will begin at 5:30 pm on Friday in the Michigan and Illinois Rooms.

Convention Office Any problems or special requests during the meeting should be reported to the Adams Room on the second floor.

Directory of Meeting Rooms Main Lobby Level: Michigan, Illinois, Minnesota, Wisconsin, Iowa, Dakota Second Floor: Hoover, Wilson, Taft, Roosevelt, Lincoln, Jackson, Jefferson, Adams, Washington Lower Level: New York, Philadelphia, Chicago (all sessions at the Leamington).

Exhibits Publishers' book exhibits will be displayed in the Jefferson Room from 5 pm to 8 pm on Wednesday, 9 am to 6 pm on Thursday and Friday, and 9 am to noon on Saturday.

Meeting Hotels Leamington Hotel, Third Avenue South, telephone number (612)370-1100 and the Curtis Hotel, Third Avenue South and 10th, telephone number (612) 340-5300.

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

Message and Information Center A self-service message center will be open on the lobby level from 5 pm to 8 pm on Wednesday, and from 8 am to 6 pm Thursday through Saturday. To reach the message center, call the Leamington main number (612) 370-1100 and ask for the SAA message center.

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Registration Registration, which includes a copy of the *Program and Abstracts* is required for attendance at all sessions. Registration desks will be open on the lobby level from 5 pm to 8 pm on Wednesday, and from 8 am to 4 pm on Thursday and Friday, and 8 am to noon on Saturday. Members who preregistered by April 1 should claim their badges and programs at the *advance registration* desk.

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

PROGRAM

THURSDAY MORNING, APRIL 15, 1982

(1) Symposium: UNDERSTANDING PREHISTORIC SETTLEMENT-SUBSISTENCE IN WEST-CENTRAL ILLINOIS

Michigan Room

Organizers and Chairpersons: C. Russell Stafford and Michael D. Wiant

Participants:

- 8:00 Stuart Struever, The Illinois Valley Archeological Program: An Historical Overview
- 8:15 Edwin R. Hajic and Thomas R. Styles, Dynamic Surficial Geology of the Lower Illinois Valley Region and the Impact on the Archaeological Record
- 8:35 David L. Asch and Nancy B. Asch, A Chronology for the Development of Prehistoric Horticulture in Westcentral Illinois
- 8:55 Bonnie Whatley Styles, Sara Ward Neusius and James R. Purdue, The Evolution of Faunal Exploitation Strategies: A Case Study in the Lower Illinois Valley
- 9:15 C. Russell Stafford, Site Structure and Formation Processes at an Early Middle Archaic Occupation in the Lower Illinois Valley
- 9:30 Michael D. Wiant, Chert Quality, Lithic Procurement, and Mobility: Archaic Resource Selection.
- 9:45 Thomas G. Cook, The Late Archaic Titterington Culture: A Dispersed Harvesting Economy
- 10:00 George H. Odell, A Diachronic View of Lithic Assemblages from a Stratified Site in the Lower Illinois Valley
- 10:15 Harold Hassen, Determining Site Activity and Spatial Patterning in a Disturbed Context
- 10:30 Jane Buikstra and Della C. Cook, Biocultural Change and Continuity in Westcentral Illinois: An Overview
- 10:50 Douglas K. Charles, Subsistence-Settlement in Westcentral Illinois: Contributions from the Archaeology of Mortuary Sites
- 11:05 Mark B. Sant and Barbara D. Stafford, Site Structure and Function in the Middle Woodland: An Example from Smiling Dan
- 11:20 Kenneth B. Farnsworth, Habitation Site Evidence for Woodland Period Regional Settlement Patterns in the Lower Illinois Valley Drainage
Discussants: James B. Griffin, James A. Brown

9:00-12:00 POSTER SESSION (Society for American Archaeology and Society for Archaeological Sciences)

Lincoln Room

(2) Symposium: BRIDGING THE ATLANTIC I: MAJOR DEVELOPMENTS IN LATE PLEISTOCENE CULTURE HISTORY

Illinois Room

Organizers and Chairpersons: Stanton W. Green and Marek Zvelebil

Participants:

- 8:00 Stanton W. Green and Marek Zvelebil, Bridging the Atlantic: A Critical Overview of American and European Archaeology
- 8:20 William H. Marquardt, Advancing the Understanding of Late Pleistocene and Holocene Societies
- 8:40 Peter Rowley-Conwy, Europe from the End of the Last Glacial to the Start of Farming
- 9:00 Van Reidhead, Theory, Method, and the Transition to Food Production
- 9:20 J. G. Lewthwaite, The Transition to Food Production in Prehistoric Europe
- 9:40 Christopher S. Peebles, Social Evolution and Devolution at Moundville: The View from the Economy
- 10:00 Susan Shennan and Stephen Shennan, The Development of Complex Society in Prehistoric Europe

not here

BRIDGING THE ATLANTIC II: ALTERNATIVE APPROACHES TO THE EXPLANATION OF CULTURE CHANGE

- 10:20 Stephen M. Perlman, Ecological Models in American Archeology
- 10:40 Paul Halstead, Recent Applications of Adaptive/Ecological Models: A View from the Right Side of the Atlantic

- 11:00 James A. Moore, Archaeological Models, Metaphors, and Social Change
 11:20 Barbara Bender, Emergent Tribal Formation in Northeast North America
 11:40 Carole L. Crumley, Transatlantic Dialectics: A Multidisciplinary Approach to Culture Change
 12:00 Klaus Randsborg, Historical Processes and Culture Change
 Discussants: A. Colin Renfrew, Robert Dunnell

(3) Symposium: ARCHAEOLOGY IN NORTHERN BELIZE

Iowa Room

Organizer and Chairperson: Fred Valdez, Jr.

Participants:

- 8:00 R. S. MacNeish, Northern Belize Preclassic
 8:15 David Freidel, Cerros: Plans, Plants and Politics at a Late Pre-Classic Lowland Maya Center
 8:30 Thomas R. Hester, Archaeology at Colha, Belize
 8:45 Juliette J. Gerhardt and Norman D. Hammond, Cuello 1978-1980: A Summary
 9:00 Diane Chase, Gann'ed But Not Forgotten: Santa Rita, Belize
 9:15 Richard W. E. Adams, The Origins of Maya Civilization in Northern Belize: Present Evidence
 9:30 Robin A. Robertson, The Protoclassic of Northern Belize: The Ceramic Evidence
 9:45 David M. Pendergast, The Post-Classic in Northern Belize
 10:00 Norman D. Hammond, Settlement Patterns in Northern Belize
 10:15 B. L. Turner, Agriculture in Northern Belize
 10:30 Harry J. Shafer, Economic Considerations of Lowland Maya Chert Tool Industries
 10:45 Fred Valdez, Jr. and Laura J. Kosakowsky, The Ceramics of Northern Belize: Changing Patterns of Interaction and Economics
 Discussants: Gordon R. Willey, R. E. W. Adams, N. D. Hammond

(4) Symposium: THE MEANING OF ARCHITECTURAL VARIABILITY AND SPACE USE

Minnesota Room

Organizers: Patricia A. Gilman and Dana B. Anderson

Chairperson: Robert Vierra

Participants:

- 8:00 Robert Vierra, Introduction
 8:05 LuAnn Wandsnider and Louis R. Binford, Discerning and Interpreting the Structure of Lazaret Cave
 8:25 Patricia A. Gilman, Determining Room and Feature Function
 8:45 Michael B. Schiffer and Randall H. McGuire, The Determinants of Architectural Design: A General Formulation
 9:05 Martha Graham, Carol Raish and Lynne Sebastian, Site Structure and Numamiut Ethnoarchaeology
 9:25 Robert J. Hard, Tarahumara Ethnoarchaeology
 9:45 E. Charles Adams, Culture Change Among the Hopi and Its Reflection in the Built Environment
 10:05 Susan Kent, Two Data Sets Are Better Than One; A Case Study of the Use of Ethnography in an Attempt to Understand Archaeological Data
 10:25 Barbara E. Cohen, Style and Message Content as Manifested in Architectural Variability
 10:45 Terje G. Birkedal, Basketmaker III Residence Units
 11:05 Dana B. Anderson and Robert Vierra, Relationships Between Site Structure and Labor Organization
 Discussant: Robert Whallon

(5) Symposium: CHANGE AND STABILITY IN THE HOHOKAM CULTURAL SYSTEM: SALT-GILA AQUEDUCT, CENTRAL ARIZONA PROJECT, ARCHAEOLOGY

Wisconsin Room

Organizers: Lynn S. Teague and Patricia L. Crown

Chairperson: Lynn S. Teague

Participants:

- 8:00 A. E. Rogge, The Salt-Gila Aqueduct Archaeological Project: Background and Context
 8:20 Suzanne Fish, Palynological Identification of Prehistoric Fields
 8:40 Charles H. Miksicek, Reconstructing Ancient Vegetation Communities in South-Central Arizona

- 9:00 Patricia Crown and Allen Dart, Variability of Hohokam Agricultural Practices as Observed from Studies Along the Salt-Gila Aqueduct, Central Arizona Project
 9:20 Christine Szuter, Identifying Food Remains in Prehistoric Rodent Assemblages
 9:40 Russell Barber and Frank Hall, Optimal Foraging Theory and Hohokam Subsistence
 10:00 Earl Sires, Hohokam Architectural Variability and Site Structure in South Central Arizona
 10:20 David R. Abbott, Variability in Redware Manufacture Among the Hohokam
 10:40 Lynn S. Teague, The Preclassic to Classic Period Transition in Hohokam Society
 11:00 Michael E. Roberts, Systems Engineering and Public Information
 Discussants: Emil W. Haury, Richard Woodbury, Glenn Rice

(6) Symposium: CULTURAL AND BIOLOGICAL CHANGE AT THE MIDDLE TO UPPER PALEOLITHIC TRANSITION

Roosevelt Room

Organizer and Chairperson: Erik Trinkaus

Participants:

- 8:30 J. Desmond Clark, The Significance of Cultural Change in the Later Pleistocene in North and South Africa
 8:50 Richard G. Klein, Cultural Evolution During the Middle and Later Stone Age in Southern Africa
 9:10 Anthony E. Marks and Harold Hietala, From Middle to Upper Paleolithic in the Southern Levant: Behavioral Inferences
 9:30 Arthur J. Jelinek, Some Aspects of Middle Paleolithic Technology in France and the Levant
 9:50 Harold L. Dibble, Variability and Change in the Middle Paleolithic
 10:10 Francis B. Harrold, The Chatelperronian and the Middle-Upper Paleolithic Transition
 10:30 Lawrence G. Straus, From Mousterian to Magdalenian: Cultural Evolution Viewed from Cantabria and Gascony
 10:50 Margaret W. Conkey, Paleolithic Art and Interpreting the Past
 11:10 Fred H. Smith, Craniofacial Morphology and the Archaic/Modern *Homo sapiens* Transition in Europe
 11:30 Erik Trinkaus, Behavioral Implications of Human Postcranial Changes at the Middle to Upper Paleolithic Transition

(7) General Session: HISTORICAL ARCHAEOLOGY AND HISTORY OF ARCHAEOLOGY

Hoover Room

Chairperson: Lawrence Desmond

Participants:

- 8:00 William Mayer-Oakes, Scholars and the Discipline—A Structural Approach to Archaeological Research Variety and its Development
 8:20 Lawrence G. Desmond, The Excavation of the Platform of Venus, Chichén Itzá, Yucatán, 1883: The First Section and Use of Photography in an Excavation in Mesoamerica
 8:40 Glenn J. Farris, Keeping History Honest: Historical Archaeology at Fort Ross
 9:00 Frederick Lange and Charles Smith, Historic Sites: Managing a Dynamic Resource
 9:20 Richard Hunter and Michael Parrington, Using a Sledgehammer Without Cracking the Nut: Industrial Archaeology in Trenton

(8) General Session: QUANTITATIVE APPROACHES TO PROCESS AND VARIATION

Hoover Room

Chairperson: Lawrence Desmond

Participants:

- 9:50 James L. Boone, Defining and Measuring Refuse Catchment
 10:10 Keith Kintigh, Measuring Archaeological Diversity Without Pain
 10:30 Jan Simek and Roy Larick, The Recognition of Multiple Spatial Patterns: A Case Study From the French Paleolithic
 10:50 Jerry Jermann, Sampling and Spatial Autocorrelation: Problems in Replicating Spatial Pattern From Sample Data
 11:10 David Rindos, Modeling Subsistence Change
 11:30 Lisa Sattenspiel, LuAnn Wandsnider and Henry Harpending, Modeling Human Land Use: Implications for Culture Change
 11:50 Terrance Gibson, Clifford Hickey and Richard Will, The Use of Microcomputers in Archaeological Research

(9) General Session: OLD WORLD ARCHAEOLOGY: RECENT STUDIES

Wilson Room
Chairperson: Paola Villa

Participants:

- 8:00 Randall White, Probable Upper Paleolithic Kill Strategies in the Perigord: A Topographic Approach
8:20 Dennis Doxtater, Spatial Orientation and Symbolism in the Ancient Farm Culture of Scandinavia
8:30 Kathleen Biddick, From Complex Chiefdoms to Feudal Societies: Towards Developing Models for Social Change in Northwestern Europe (300 BC-AD 800)
8:50 Paola Villa, Geographic Variability and Raw Materials in the Acheulian of Western Europe
9:10 J. Emlen Myers and James L. Boone, Archaic States of Medieval Morocco: Resource Distribution and Territorial Organization
9:30 Oystein S. LaBianca, The Food Production System of Modern and Ancient Hesban in Jordan
9:40 Kay Simpson, Linear Locational Models for a Middle Euphrates Regional System
9:50 Kathryn Maurer Trinkaus, Political Aspects of Style and Information in Mortuary Ritual
10:10 Barbara Thiel, Reconstructing Southeast Asian Prehistory

(10) General Session: COASTAL-MARITIME ADAPTATIONS

Wilson Room
Chairperson: Joseph J. Lischka

Participants:

- 10:50 Christopher Edens, A Novel Archaeological Configuration in the Arabian Gulf
11:10 Barry Lewis, Archaeological Site Distributions on the Mississippi Gulf Coast
11:30 David R. Watters, Marine Resources from Barbuda and Montserrat
11:40 Joseph J. Lischka, Prehistoric Maritime Adaptations on the Peruvian Coast

THURSDAY AFTERNOON, APRIL 15, 1982

12:00- THESE CHANGING TIMES: THE FEDERAL RESPONSE TO CULTURAL RESOURCE
1:15 MANAGEMENT (Coordinating Council of National Archeological Societies)

Iowa Room
Chairperson: Hester A. Davis

Participants: R. M. Housley, Deputy Chief, US Forest Service; R. Davidge, Special Assistant to Assistant Secretary Arnett, US Dept of Interior; Lewis Blakely, Chief, Planning Division of Civil Works, US Army Corps of Engineers; A. Aldridge, Chair, Advisory Council on Historic Preservation

Panel discussion about the GAO's report on federal archaeology and the cutbacks in federal spending which may cause some dislocation in past commitments and performance with respect to cultural resource management. The four panelists will present their agencies' response to these changes with their views of the future.

12:15- CREATION-SCIENCE: THE CURRENT CHALLENGE (SAA Committee on the "Creation-
1:15 Science" Phenomenon)

Minnesota Room
Chairperson: Ann M. Early

Discussion of legislation, the debate, information sources, and potential roles for SAA members.

(11) Symposium: AMERICAN BOTTOM ARCHAEOLOGY: RESULTS OF THE FAI-270 AR-
CHAEOLOGICAL MITIGATION PROJECT

Michigan Room
Organizer and Chairperson: James W. Porter

Participants:

- 1:30 J. Porter and J. Walthall, American Bottom Archaeology and the FAI-270 Project
1:50 John E. Kelly, The Range Site: Implications for Emergence of Mississippian Culture in the American Bottom
2:10 Andrew C. Fortier, Archaeological Investigations in the Hill Lake Locality of the American Bottom

- 2:30 T. Emerson and G. Milner, Community Organization and Settlement Patterns of Peripheral Mississippian Sites in the American Bottom
2:50 Dale L. McElrath, Culture History of the American Bottom as Seen from the Adjacent Highlands
3:10 Warren L. Wittry, An Early Woodland Mortuary Site
3:30 George R. Milner, The Health Status of Mississippian Peoples of the American Bottom
3:50 William P. White, Spatial and Temporal Variations in Floodplain Geomorphic Phenomena and Their Effects on Prehistoric Cultural Distributions
4:10 Sissel Johannessen, Paleoethnobotanical Trends in the American Bottom
4:30 L. Kelly and P. Cross, Animal Exploitation in the American Bottom
Discussants: Donald W. Lathrap and James B. Griffin

(12) General Session: ETHNOARCHAEOLOGY

Illinois Room
Chairperson: Richard Wilk

Participants:

- 3:00 Richard R. Wilk, Little House in the Jungle; The Causes of Variation in House Size Among Modern Maya
3:20 William A. Longacre, Pottery Use-life in a Kalinga Village, Northern Luzon, The Philippines
3:40 Gloria A. London, Ethnoarchaeology of Full-Time Pottery Specialists in Paradijon, Southeastern Luzon, The Philippines
4:00 George C. Knight, Ethnoarchaeology: Archaeology in the Context of Discovery
4:20 Emily H. Garber, Futuralists and Pastoralists: Planned Mobility and Storage Strategies Among Herding Peoples
4:40 Claudia Chang, The Contribution of Ethnoarchaeological Research to Changing Patterns of Land Use in a Greek Village

- 2:00- POSTER SESSION (Society for American Archaeology and Society for Archaeological
5:00 Sciences)
Lincoln Room

(13) Symposium: TOWARDS A GENERAL THEORY OF HUNTER-GATHERER TECHNOLOGY:
EFFICIENCY AND ECONOMIZING STRATEGIES

Iowa Room
Organizers and Chairpersons: Robin Torrence and Robert Joslin-Jeske

Participants:

- 1:30 Robin Torrence, Time, Efficiency and Hunter-Gatherer Technology
1:50 John S. Hewitt, Models of Efficient Behavior
2:10 Rochelle Lurie, Measuring Efficiency in the Use of Lithic Materials
2:30 Eileen Camilli, The Functional Role of Lithic Assemblages and Efficiency Strategies
2:50 Robert Joslin-Jeske, Economies in Raw Material Use by Prehistoric Hunter-Gatherers
3:10 Carol A. Morrow and Richard Jeffries, Curate Theory as a Means of Determining the Role of Lithic Material in Culture Systems
3:30 Peter C. Woodman, Problems of Procurement and Population Mobility in the Later Mesolithic of N.E. Ireland
3:50 Roger A. Boydston, The Use of Cost-Benefit Analysis in Prehistory: A Consideration of Technological Development and Change
4:10 Brian Hayden, From Chopper to Celt: The Evolution of Resharpener Techniques
Discussant: Michael Jochim

(14) Symposium: CRM: MANAGING THE RESOURCE

Minnesota Room
Organizer and Chairperson: Margaret Kimball Brown

Participants:

- 1:30 Margaret Kimball Brown, Mothballing Albany Mounds
1:50 Geoffrey Gyrisco, Tools to Preserve Archaeological Resources
2:10 J. Jerry Nielson and Bennie Keel, Case Study in Preservation Strategy: Roods Creek Mounds, Georgia
2:30 Richard Ford, The Archaeological Conservancy, Inc.

- 2:50 Larry Nordby, Ruins Preservation in the Southwest
 3:10 Mark Barnes, Archaeological Site Preservation Through Interagency Cooperation: A Model from the San Juan Basin
 3:30 John Walthall, Site Preservation and Highway Archaeology in Illinois
 3:50 Bruce MacMillan, Preservation of Collections: A View from the Museum
 4:10 Glenn F. Tiedt, Easements and Artifacts: An Archaeological Investigation of the Internal Revenue Code
 Discussants: Bruce Rippeteau, Michael E. Roberts

(15) Symposium: RECENT DEVELOPMENTS IN HOHOKAM ARCHAEOLOGY

Wisconsin Room

Organizers and Chairpersons: JoAnn E. Kisselburg and Owen Lindauer

Participants:

- 1:30 Owen Lindauer, Introduction
 1:35 Elinor G. Large, The Hohokam-Pima Relationship: Gap or Continuum?
 1:55 Roberta A. Jewett, A Design Attribute Analysis of Hohokam Red-on-Buff Ceramics
 2:15 JoAnn E. Kisselburg, Reexamining the Variability in Ceramic Design
 2:35 Owen Lindauer, A "Behavioral" Approach to Artifact Scatters
 3:05 Sam W. Baar, Postsedentary Hohokam Architectural Units
 3:15 David A. Gregory, The Morphology of Platform Mounds and the Structure of Classic Period Hohokam Sites
 3:35 Jerry B. Howard, Hohokam Community Organization at La Ciudad de los Hornos
 3:55 David R. Wilcox, The Significance of Hohokam Ballcourts
 4:15 Chad T. Phinney and Gina Laczko, Rethinking the Pueblo Grande Interaction Sphere
 Discussants: Fred T. Plog, David E. Doyel

(16) Symposium: NATIONAL PARK SERVICE ARCHAEOLOGY IN THE MIDWESTERN UNITED STATES

Roosevelt Room

Organizer and Chairperson: Mark J. Lynott

Participants:

- 1:30 David S. Brose, Archaeological Investigations in Cuyahoga Valley N.R.A.
 1:50 James A. Brown, Mound City and the Vacant Ceremonial Center
 2:10 Robert J. Salzer, Apostle Islands Archaeology
 2:30 Mark J. Lynott, Woodland Period Adaptive Patterns in Northern Minnesota
 2:50 Leslie Perry and Douglas Kennedy, A Comparison of Woodland Lithic Technology in Southern Missouri and Northwestern Wisconsin
 3:10 Jeffrey J. Richner, Old Munising: Economic Boom and Bust at a 19th Century Company Town
 3:30 James E. Price and Cynthia R. Price, Ozark National Scenic Riverways Archaeological Research Program
 Discussants: F. A. Calabrese, Douglas H. Scovill

(17) Symposium: UNPUBLISHED ARTIFACTS FROM THE CENOTE OF SACRIFICE, CHICHÉN IZTÁ, YUCATÁN, MEXICO

Hoover Room

Organizer and Chairperson: C. Coggins

Participants:

- 1:30 J. W. Ball, The Chronology of Public Ceremonialism at El Cenote Sagrado, Chichén Itzá: A Ceramic Reassessment
 1:50 J. T. Taschek, Specialized Pre-Columbian Offertory Activities at Cenote Xlacah, Dzibilchaltún
 2:10 J. Lothrop, Textiles From the Cenote of Sacrifice at Chichén Itzá
 2:30 P. Sheets and D. L. Bathgate, Ritual and Utilitarian Aspects of the Chipped Stone Artifacts From the Sacred Cenote of Chichén Itzá
 2:50 H. Moholy-Nagy, Artifacts of Shell, Bone and Ground Stone From the Cenote of Chichén Itzá
 3:10 C. Coggins, Wooden Objects From the Cenote of Sacrifice
 3:30 E. A. Coughlin, Artifacts From the Sacred Cenote at Chichén Itzá: Analysis, Identification, Characterization, Chronology
 Discussant: G. R. Willey

(18) Symposium: CURRENT RESEARCH IN AFRICA AND THE LEVANT: COMPARISONS AND CORRELATIONS

Wilson Room

Organizer and Chairperson: Douglas R. Connor

Participants:

- 1:30 Kimball M. Banks, The Environmental Parameters Governing the Spread of Cattle Pastoralism in the Southern Sahara
 1:50 John R. F. Bower, Origins of Diversity in East African Pastoralism
 2:10 Steven A. Brandt, The Prehistory of Somalia: New Archaeological Research
 2:30 Douglas R. Connor, Cattle Pastoralism in the Sahara: Evidence for a Neolithic Complex in the 8th Millennium BC
 2:50 T. R. Hays, Current Research on the Neolithic of the Central Sudan
 3:10 Fred Wendorf, Late Paleolithic Food Production Along the Egyptian Nile
 3:30 Donald O. Henry, Prehistory of Southern Jordan
 3:50 Phillip W. Volkman, Lithic Technological Transition from Middle to Upper Paleolithic in the Levant
 4:10 C. Garth Sampson, Spatial Organization of San Bushmen Sites in the Zeekoe Valley, South Africa

5:30 OPEN HOUSE

Iowa Room

Cashiered Bar

5:30- COSWA BLACKBERRY WINTER RECEPTION

7:00 Wilson Room

Organizer: Janet L. Friedman

Reception for women archaeologists to meet senior colleagues.

5:30- SOCIETY FOR ARCHAEOLOGICAL SCIENCES

7:00

Taft Room

Business Meeting

Chairperson: Jonathon Ericson

5:30- MICRONESIAN WORKSHOP (Micronesian Archaeological Survey)

7:00

Roosevelt Room

Chairperson: Thomas F. King

Informal discussion and data sharing on the archaeology of the islands of the West-central Pacific.

THURSDAY EVENING, APRIL 15, 1982

8:00 PLENARY ADDRESS

Michigan and Illinois Rooms

DIVIDED WE STAND: ASPECTS OF ARCHAEOLOGY AND INFORMATION

A. Colin Renfrew

FRIDAY MORNING, APRIL 16, 1982

(19) Symposium: ENVIRONMENTS AND EXTINCTIONS: MAN IN THE LATE GLACIAL NORTH AMERICA

Michigan Room

Organizers and Chairpersons: Jim I. Mead and David J. Meltzer

Participants:

- 8:00 Alan Bryan, The Timlin Site
 8:15 Gary Haynes, On Watering Holes, Mineral Licks, Death and Predation

- 8:30 Richard Shutler, Jr., Dating the Peopling of North America
 8:45 Russell W. Graham, Evolution of Late Quaternary Biotic Communities: Human Response
 9:00 Robert S. Thompson, Vegetation Change and Archaeology in the East-Central Great Basin
 9:15 George C. Frison, The Agate Basin Site
 9:30 Larry D. Martin, The Effect of the End of the Pleistocene on Man in the New World
 9:45 J. M. Adavasio, J. Donahue, K. Cushman and J. D. Gunn, Paleoenvironmental Reconstruction at Meadowcroft Rockshelter, Washington County, Pennsylvania
 10:00 Break
 10:20 C. Vance Haynes, The Stratigraphic Evidence of Pleistocene Extinction in the United States
 10:40 David J. Meltzer and Jim I. Mead, Radiocarbon Dating and Late Pleistocene Extinctions
 11:00 Paul S. Martin and Robert S. Thompson, Ground Sloth Extinction and the Blitzkrieg Model
 11:20 Donald K. Grayson, Some Tests of the Overkill Hypothesis
 11:40 David Webster and Gary Webster, Optimal Foraging and Pleistocene Extinction

(20) General Session: EXCHANGE SYSTEMS

Illinois Room
 Chairperson: Joy Stevenson

Participants:

- 8:00 Jill E. Neitzel, The Structure of Exchange Networks in the American Southwest
 8:20 Douglas B. Craig, A Fall-Off Model for the Upper and Middle Santa Cruz Exchange Network in Shell
 8:30 Gary M. Brown, Lithic Exchange and Production on Anderson Mesa, North Central Arizona
 8:50 Timothy G. Baugh, Definition and Structure of the Southern Plains Macroeconomy
 9:10 Sylvia Chappell, Stone Axe Sizes and Exchange Processes in Neolithic Britain

9:00 SOCIETY OF PROFESSIONAL ARCHEOLOGISTS

Washington Room
 Meeting of the Board of Directors

(21) General Session: SPATIAL ARCHAEOLOGY

Illinois Room
 Chairperson: Joy Stevenson

Participants:

- 10:00 Joy Stevenson, Intensive Utilization of Space at a Multicomponent Site in Southwestern Colorado
 10:10 Jeanette E. Stephens, The Locational Efficiency of Facilities at Archaeological Sites
 10:30 Livingston Sutro and Theodore Downing, Zapotec Domestic Space: A Diachronic Ethnoarchaeological Analysis
 10:40 Glen E. Rice, Improving Our Methods for Prehistoric Community Pattern Analysis
 11:00 J. Jefferson Reid and Stephanie Whittlesey, Determining Functional Equivalence in Settlement Analysis
 11:10 Janet E. Rafferty, The Archaeological Recognition of the Development of Sedentarity
 11:30 Roy R. Larick and Jean-Philippe Rigaud, Chert Acquisition and Use as Indicators of Paleolithic Occupation Type and Length: Evidence from Le Flageolet

(22) General Session: THE ANALYSIS OF BONE

Iowa Room
 Chairperson: T. Douglas Price

Participants:

- 8:20 T. Douglas Price and Maureen Kavanagh, Bone Composition and the Reconstruction of Diet
 8:30 Ann L. Magennis and Debra L. Martin, Microscopic Techniques for Ossuary Analysis: An Example from Cape Code, Massachusetts
 8:40 Nerissa Russell, Experimentation as an Aid to the Study of Manufacture and Utilization Patterns of Bone Artifacts
 9:00 Alice M. Choyke, The Use of Bone, Antler and Tooth as Materials for Tools

- 9:20 Richard W. Redding, An Explanation of Variation in the Sheep/Goat Ratio for Middle Eastern Archaeological Faunas

(23) General Session: SOCIETAL ADJUSTMENTS TO STRESS

Iowa Room
 Chairperson: R. J. Sharer

Participants:

- 10:00 Kenneth Reid and Joe Artz, Environmental Stress and the Origins of Arkansas Basin Caddoans: A Cross Timbers Perspective
 10:20 Stephen C. Lensink, Population Trends for Holocene Foragers: A Case Study from the Prairie Marshes of the Midwestern U.S.
 10:40 Ann F. Ramenofsky, Archaeological Evidence for European Disease and Native American Depopulation
 11:00 John R. Cole and M. T. Mulholland, Climate and Culture in Western Massachusetts
 11:20 John D. Schelberg, The Development of Social Complexity in Chaco Canyon

(24) Symposium: ADVANCES IN OBSIDIAN HYDRATION DATING (Sponsored by SAS)

Minnesota Room
 Organizer and Chairperson: Jonathon E. Ericson

Participants:

- 9:00 J. E. Ericson, Introduction
 9:10 C. M. Nelson, J. W. Michels and I. S. Tsong, Obsidian Dating to 50,000 Years in East Africa
 9:30 Jonathon Ericson, Correlation Between Empirical and Experimentally Derived Hydration Rates
 9:50 J. S. Michels, I. S. Tsong and G. A. Smith, Experimentally Derived Hydration Rates for Obsidian in the Valley of Mexico
 10:10 A. Jurgensen, D. Clark and B. Purdy, Analysis of Film Formation on Obsidians and Tektites
 10:30 W. Landford, Application of Nuclear Reaction Analysis to the Study of Hydration Mechanisms and to Dating
 11:00 Irwin Scollar, Geophysical Prospecting and Remote Sensing: Natural and Technical Limits for Archaeology (SAS-Sponsored Special Lecture)

(25) General Session: SOUTHWESTERN ARCHAEOLOGY

Wisconsin Room
 Chairperson: Nan A. Rothschild

Participants:

- 8:00 John W. Hohmann, Sinagua Mortuary Ritual: Inferences in Prehistoric Social Complexity
 8:20 Richard C. Lange and Barbara Murphy, Settlement in the Sierra Ancha
 8:30 Michael E. Whalen, Settlement System Evolution in the Quemada Area of West-Central New Mexico
 8:50 Thomas C. Windes, A Second Look at Population in Chaco Canyon
 9:10 Nancy J. Akins, Faunal Exploitation in Chaco Canyon, New Mexico
 9:30 Alan H. Simmons, Archaic Adaptive Strategies and Early Horticulture in the Chaco Canyon Region
 9:40 Wirt Willis, John Speth, Richard Ford and Austin Long, Bat Cave Reinvestigated
 10:00 David Carmichael, Fresnel Shelter, New Mexico: Preliminary Dating and Evidence for Early Cultigens
 10:20 Shereen Lerner and Rachel Most, An Alternative Explanation for Pan-Regional Variation: An Example from the Southwest
 10:40 Gina Laczko, Mesa Verde Settlement Patterns
 11:00 Laura Alter and Robert K. Vierra, Variability, Periodicity and Decision-Making in Dry-Land Farming
 11:20 Allen E. Kane, Janet Orcutt and Timothy Kohler, Dolores Archaeological Program Approaches to Paleodemographic Reconstructions

(26) General Session: CONTEMPORARY MATERIAL CULTURE/IDEOLOGY STUDIES

Roosevelt Room
 Chairperson: Gordon Bronitsky

Participants:

- 8:30 Gordon Bronitsky, Praise the Lord and Compare the Data: Phase II

- 8:50 Miles Richardson, The Temple and the Auditorium: Interpreting the Material Culture of the Spanish American *Iglesia* and the Southern Baptist Church, An Ideational-Behavioral Approach
- 9:10 Daniel Ingersoll, Jr. and Karl Harshbarger, Why a Yellow Ribbon?
- 9:30 Jeanette McKenna, Acculturation Processes as Reflected in Piman Household Patterns

(27) General Session: ARCHAEOMETALLURGY

Roosevelt Room
Chairperson: Gordon Bronitsky

Participants:

- 10:30 Allen P. McCartney, Reevaluation of Metal Use by Tule Eskimos of the Canadian Arctic
- 10:50 Helen Schenck, Metallurgical Analysis of Iron from Catoctin, Maryland
- 11:00 Stephen M. Epstein, The Inca Copper Smelting Industry at Cerro de los Cementerios, Peru
- 11:20 Paul A. Raber, The Development of Copper Metallurgy in Cyprus

(28) Symposium: CURRENT RESEARCH AND TRENDS IN NORTH SLOPE ARCHAEOLOGY

Hoover Room
Organizers and Chairpersons: Peter M. Bowers and S. Craig Gerlach

Participants:

- 8:00 Edwin S. Hall, Jr., Archaeological Research in Northern Alaska: An Overview
- 8:20 John W. Carnahan, Historic and Current Research by the North Slope Borough
- 8:40 Dale C. Slaughter, Siraagruk: Whalers and Cultural Change in the Late 19th Century Northern Alaska
- 9:00 Georgeanne L. Reynolds, Ownership Marks from Utkiavik (Barrow), Alaska
- 9:20 Wendy H. Arundale, Research on the North Slope: Recent Directions and Future Needs
- 9:40 Jean S. Aigner, Land Use Activities in the Mosquito Lake/Aitgun Area of Northern Alaska
- 10:00 K. M. Schoenberg, The Archaeology of Kurupa Lake
- 10:20 Michael L. Kunz, The Mesa: An Early Holocene Archaeological Site in Northern Alaska
- 10:40 Peter M. Bowers, A Processual View of the Elusive Culture History of the Alaskan Arctic Foothills: Complexities, Problems, Solutions
- 11:00 S. Craig Gerlach and Arthur E. Spiess, Comparative Studies of Caribou Exploitation Strategies at Tukuto Lake Northern Alaska: The Croxton Caribou Kill
- 11:20 Richard O. Stern, Cultural Resource Investigations in Northwestern Alaska
Discussants: Ernest S. Burch, Jr., Albert A. Dekin, John M. Campbell
(Hoover Room reserved for discussants, 1:30-2:30 pm)

(29) Symposium: CULTURAL RESOURCE MANAGEMENT AND THE U.S. ARMY CORPS OF ENGINEERS

Wilson Room
Organizers and Chairpersons: Sannie Kenton and Daphne Derven

Participants:

- 8:00 Larry Banks, A History of the Development of Cultural Resource Activities in the Corps
- 8:20 Daphne L. Derven, The Regulatory Program and Its Impacts on Cultural Resources
- 8:40 Sannie Kenton, Knight's Ferry: Evolution and Future of an Early California Industrial Complex
- 9:00 Jerald J. Johnson and Dorothea J. Theodoratus, The Dutch Gulch Lake Project: A View of Methodological Approaches to the Study of Prehistoric Populations Through Great Depression Populations
- 9:20 Robert J. Burton, The Lewisville Site and Agency Archaeology
- 9:40 Cheryl A. Smith, Competitive Bio-Procurement of Archaeological Services
- 10:00 Jerry H. Altschul, Bug Hill: Excavation of a Multi-Component Midden Mound, Clayton Lake, Oklahoma
Discussants: Dee Ann Story, Mark Raab, John Belshe

(30) Symposium: CURRENT PROBLEMS IN THE ARCHAEOLOGY OF COASTAL ECUADOR

Wilson Room
Organizers and Chairpersons: Ronald D. Lippi and Allison C. Paulsen

Participants:

- 11:00 Ronald D. Lippi, A New Machalilla Ceramic Sequence
- 11:20 Deborah M. Pearsall, Subsistence Basis of the Coastal Ecuadorian Formative
- 11:40 Eugene J. McDougale, Further Studies of the Prehistoric Water Management System of Southwest Ecuador

FRIDAY AFTERNOON, APRIL 16, 1982

12:00- NATIONAL ASSOCIATION OF STATE ARCHEOLOGISTS
1:15

Wilson Room
Business Meeting
Chairperson: Robert Stephenson

12:00- CURATION COMMITTEE OF THE COUNCIL FOR MUSEUM ANTHROPOLOGY
1:15

Roosevelt Room
Chairpersons: Sandra C. Parker, Alexander J. Lindsay, Jr.
Open meeting to discuss current issues and problems in the curation of archaeological collections.

12:00- SAA COMMITTEE ON PUBLIC ARCHAEOLOGY (COPA)
1:15

Hoover Room
Chairperson: Ruthann Knudson
Semiannual meeting open to all members of the SAA to discuss current affairs in public archaeology.

(30) (Continued) Symposium: CURRENT PROBLEMS IN THE ARCHAEOLOGY OF COASTAL ECUADOR

Wilson Room
Organizers and Chairperson: Ronald D. Lippi and Allison C. Paulsen

Participants:

- 1:30 Karen E. Stothert, Traditional *Albarradus* and Ancient Water Control and the Santa Elena Peninsula, Ecuador
- 1:50 Richard G. Whitten, Nature and Function of Certain Raised Fields, Guayas Basin, Ecuador
- 2:10 Jonathan E. Damp, Structure as House, House as Structure: Early Valdivia Social and Economic Design
- 2:30 James Zeidler, San Isidro, A Valdivia Site near Bahia, North Coastal Ecuador
- 2:50 Persis B. Clarkson, New Evidence of Chorrera/Engoroy Society and Community
- 3:10 Earl H. Lubensky, The Huancavilcus in the Guayas Basin
- 3:30 Carl D. Spath, The Forgotten Sea Traders of La Puna, Ecuador
- 3:50 Colin McEwan, Seats of Power: Sociocultural Evolution of Agua Blanca, Manabi
- 4:10 Marcelo Villalba, Centro Ceremonial—Area Rural, Implicaciones del Proceso Urbano en el Formativo Temprano de la Costa Ecuatoriana
Discussants: Allison C. Paulsen, Deborah M. Pearsall

(31) Symposium: THE SOCIO-POLITICS OF ARCHAEOLOGY

Michigan Room
Organizers and Chairpersons: Joan Gero and Michael L. Blakey

Participants:

- 1:30 Michael L. Blakey, A Macroscopic View of Archaeological Behavior
- 1:50 Robert Paynter, Field or Factory? Concerning the Degradation of Archaeological Labor

- 2:10 David M. Lacy and Robert J. Hasenstab, The Development of Least Effort Strategies in CRM: Competition for Scarce Resources in Massachusetts
- 2:30 Olga Soffer, The Politics of the Paleolithic in the USSR: A Case of Paradigms Lost
- 2:50 John E. Yellen, Women in Archaeological Research: An NSF Perspective
- 3:10 Joan M. Gero, Cross-Cultural Gender Bias in Archaeology
- 3:30 Marsha Hanen and Jane Kelley, Social and Philosophical Frameworks for Archaeology
- 3:50 H. Martin Wobst and Arthus S. Keene, Archaeological Explanation as Political Economy
Discussant: Margaret Conkey

(32) Symposium: URBAN ARCHAEOLOGY IN THE UNITED STATES

Illinois Room

Organizer and Chairperson: Edward Staski

Participants:

- 1:30 Kenneth J. Basalik, Urban Anthropology in the Mid-Atlantic: Prospects for Anthropology?
- 1:50 Stephen A. Mrozowski, Urbanization as a Factor in Archaeological Site Formation
- 2:10 Roy S. Dickens, Jr., Infrapatterns and the Formation of the Urban Archaeological Record
- 2:30 Sarah H. Hill, A Consideration of Manufacture Deposition Lag in Urban Site Formation
- 2:50 John P. McCarthy, Examining Socio-Cultural Variation: An Approach to the Archaeology of Urban America
- 3:10 Edward Staski, Just What Can a 19th Century Bottle Tell You? Archaeological Interpretations of Urban Drinking Behavior
- 3:30 Suzanne M. Spencer-Wood, Archaeological Tests of an Urban Socio-Economic Model
- 3:50 H. J. Merrick, Against the Grain: The Significance of Ethnic Non-Conformity in Urban Site Evaluation
- 4:10 Patricia E. Rubertone, Measuring Organization, Examples from Urban Archaeological Research

(33) Symposium: NATIONAL ARCHAEOLOGICAL RESEARCH TOPICS: AN INITIAL FORMULATION

Iowa Room

Organizer and Chairperson: Thomas F. King

Participants:

- 1:30 Thomas F. King, Good Day, Good NART (Introduction)
- 1:35 Joseph A. Tainter, Social Collapse as a National Archaeological Research Topic
- 1:55 John R. Kern, Social Change: The Rise and Fall of Tenancy in the Cotton South
- 2:15 Thomas F. King, The Once and Future Drought: Climate Change as a National Archaeological Research Topic
- 2:35 Ronald Anzalone, Space: The Final Frontier?
- 2:55 Bennie C. Keel and Victor A. Carbone, National Archaeological Research Topics and Data Recovery Programs

(34) Symposium: THE LANGE/FERGUSON (39SH33) CLOVIS KILL-BUTCHERY SITE: OF MEN, MAMMOTHS, AND MICE

Iowa Room

Organizer and Chairperson: L. Adrien Hannus

Participants:

- 3:40 L. Adrien Hannus, Evidence of Mammoth Butchering at the Lange/Ferguson (39SH33) Clovis Kill Site
- 4:00 Everett M. White, A Reconstruction of the Geologic and Soil Environment at the Lange/Ferguson (39SH33) Clovis Kill Site
- 4:20 James E. Martin, Vertebrate Fossils from the Lange/Ferguson (39SH33) Clovis Kill Site
- 4:40 A. Byron Leonard, Ecological and Climatic Implications of Fossil Mollusks at the Lange/Ferguson (39SH33) Clovis Kill Site

(35) Symposium: LITHIC TECHNOLOGY IN THE LATE PLEISTOCENE

Minnesota Room

Organizers and Chairpersons: John R. Grimes and R. Michael Gramly

Participants:

- 1:30 Curtis Tunnell, Analysis and Replication of a Portion of the Folsom Lithic Reduction Process at the Adair-Steadman Site
- 1:50 John R. Grimes, Hafted Microtools from Bull Brook Paleoindian Site
- 2:10 Linda Taranik Grimm, Patterns of Stone Tool Manufacture and Use in the Upper Paleolithic of Southwestern France

- 2:30 Marylou Curran, The Lithic Record and Internal Site Structuring at the Whipple Site
- 2:50 R. Michael Gramly, Gravels and Denticulates from the Vail Paleoindian Site
- 3:10 Jonathan C. Lothrop, *Pièces Esquillées* from the Vail Site: Techno-Functional Implications for Paleoindian Studies
- 3:30 Cheryl P. Claassen and Elizabeth A. Coughlin, Silicious and Microfossil Residues on Stone Tools: A New Methodology for Identification and Analysis
- 3:50 Arthur Spiess, Arctic Garbage and New England Paleoindians: The Single Occupation Option
Discussants: Frederick H. West, Lawrence Keeley

(36) Symposium: PEER POLITY INTERACTION AND SOCIOPOLITICAL CHANGE

Wisconsin Room

Organizer and Chairperson: Colin Renfrew

Participants:

- 1:30 Colin Renfrew, Peer Polity Interaction as an Analytical Frame
- 1:50 Stephen J. Shennan, Interaction and Change in Third Millennium BC Europe
- 2:10 David P. Braun, Midwestern Middle Woodland Exchange and Supralocal Interaction
- 2:30 Gina Lee Barnes, Peer Polity Interaction in the East Asian Sphere
- 2:50 Timothy Champion and Sara Champion, Peer Polity Interaction in the European Iron Age
- 3:10 Henry T. Wright, Peer Polity Interaction in Early Mesopotamia
- 3:30 John F. Cherry, Peers, Politics and Palaces: Some Problems in Minoan State Formation
- 3:50 Richard Hodges, Peer Polity Interaction and the Political Evolution of Medieval Italy
- 4:10 Jeremy A. Sabloff, Interaction Among Late Classic Maya Polities
Discussants: Antonio Gilman, David C. Grove

(37) Symposium: STATISTICAL ANALYSIS OF ARCHAEOLOGICAL DATA STRUCTURES

Roosevelt Room

Organizer and Chairperson: Christopher Carr

Participants:

- 1:30 Sandra Parker, Validating Multivariate Logistic Models of Site Locations Using Sequential Analysis
- 1:50 David B. Waddell, Selection of Attributes for Predictive Modeling of Site Location
- 2:10 Kenneth L. Kvamme, Methods for Analyzing and Understanding Hunter-Gatherer Site Location as a Function of Environmental Variability
- 2:30 N'omi Greber, A Continuity Model for the Distribution of Manufactured Items
- 2:50 Christopher Carr, Dissecting Intra-site Distributions as Palimpsests
- 3:10 Marcia Jones, The Significance of Intra-site Variability in Technological Indices: A Test Case
- 3:30 Mariam Chernoff, Empirical Bayes Estimation of Ceramic Proportions at Teotihuacán
- 3:50 Charles M. Hoffman, Projectile Point Morphology: Influences of Measurement Techniques on Data Structure
Discussants: George Cowgill, Harold Hietala

(38) General Session: CERAMIC ANALYSIS IN ARCHAEOLOGY

Hoover Room

Chairperson: George R. Holley

Participants:

- 3:00 Mary Jane Berman, A Discussion of Vessel Volume Variability: A Comparative Study from Westcentral New Mexico
- 3:20 S. Terry Childs, Regional Ceramic Variation from Cape Cod, Massachusetts
- 3:30 George R. Holley, Elaboration and Ceramic Change: A Morphometric Perspective
- 3:50 Timothy Kaiser, Implications of Changing Patterns of Ceramic Production in the Balkan Neolithic
- 4:10 Steven E. Falconer, Ceramic Degeneration and Socioeconomic Inference in Southwestern Asia
- 4:30 Diane E. Beynon and Jack Donahue, Tempering Types and Sources for Early Bronze Pottery at Bab-edh-Dhra and Numeira, Jordan

5:30 SOCIETY FOR AMERICAN ARCHAEOLOGY ANNUAL BUSINESS MEETING

Michigan and Illinois Rooms

Richard E. W. Adams, President

FRIDAY EVENING, APRIL 16, 1982

7:30 SOCIETY OF PROFESSIONAL ARCHEOLOGISTS

Taft Room
Business Meeting
Chairperson: Jerald T. Milanich

8:00 NEW MEMBER RECEPTION

Lincoln Room
All new SAA members and members attending their first annual meeting are invited to this reception hosted by present and past Society officers.

SATURDAY MORNING, APRIL 17, 1982

(39) General Session: ARCHAEOLOGY OF THE AMERICAN MIDWEST

Michigan Room
Chairperson: Robert Nykamp

Participants:

- 8:00 Nathan D. Hamilton, James B. Petersen and Alan McPherron, Late Woodland Perishable Industries of the Juntunen Site, Upper Great Lakes
- 8:10 Victoria Dirst, The Eureka to Omro Archaeological Survey
- 8:20 Dean J. Saitta, The Explanation of Change in Egalitarian Society: A Critique
- 8:40 Robert Sasso and Rochelle Lurie, A New Approach to the Classification of Ground-stone Tools
- 9:00 Jon Muller, Salt, Specialization and Mississippian Production
- 9:20 David L. Carlson, Excavations at Judy's Canal, A Mississippian Site in the American Bottom
- 9:30 Laurence Bartram, Jr., Titterington Settlement Patterns in the Lower Illinois Valley
- 9:40 Lucy A. Whalley, Diversity in Late Bluff/Mississippian Plant Exploitation in the American Bottom of Illinois
- 10:00 Sidney G. Denny and William Woods, The Sumac Site: A Crab Orchard Hamlet in Southern Illinois
- 10:10 Frank Rackerby, An Update on Kincaid Research and Development 1976-1981
- 10:20 Donna C. Roper, Prehistoric Cultural Stability in the Missouri Ozarks: A Trial Model
- 10:40 J. Daniel Rogers, Recent Excavations at Spiro Mounds, Eastern Oklahoma
- 10:50 George Sabo III, The Huntsville Site (3MA22), A Caddoan Civic-Ceremonial Center in the Arkansas Ozarks
- 11:10 Marvin Jeter, The Protohistoric "Tillar Complex" of Southeast Arkansas
- 11:30 Sharon I. Goad, Poverty Point, The 1981 Excavations, Evidence of Subsistence and Habitation

(40) Symposium: THE SMALL-SCALE SURVEY REVISITED

Illinois Room
Organizers: Carolyn A. Hale-Pierce and Mark S. Aldenderfer
Chairperson: Carolyn A. Hale-Pierce

Participants:

- 8:00 Carolyn A. Hale-Pierce, Where Do We Go From Here? The Small-Scale Survey Revisited
- 8:20 Thomas T. Padgett, Relevance and Responsiveness in Small-Scale Surveys for Transportation and Public Works Projects
- 8:40 Ezra B. W. Zubrow, Designing Small-Scale Archaeological Surveys: Theoretical Limitations and Case Examples
- 9:00 Robert J. Hasenstab and David M. Lacy, The Role of Small-Scale Surveys: Isolated Reports or Integrated Research?
- 9:20 Eric G. Hansen, Small-Scale Surveys and Regional-Level Research
- 9:40 Marcia Tate and Bruce E. Rippeteau, Culture History from Energy Development
- 10:00 Peter S. Miller, The Big Business of Small-Scale Surveys
- 10:20 Mark S. Aldenderfer, Regional Research Institutions and the Small-Scale Survey

(41) Symposium: INDUSTRY AND ARCHAEOLOGY

Illinois Room
Organizers and Chairpersons: James E. Fitting and James J. Shive

Participants:

- 11:00 James E. Fitting, Industry and Archaeology
- 11:20 Leeland Patterson, The Oil and Gas Industry
- 11:40 Timothy C. Paeltz, The Coal Industry

9:00 SOCIETY FOR AMERICAN ARCHAEOLOGY

Washington Room
Meeting of the Executive Committee

(42) General Session: CENTRAL MEXICAN PREHISTORY AND ETHNOHISTORY

Iowa Room
Chairperson: M. W. Spence

Participants:

- 9:00 Virginia L. Ehrman, An Analysis of the Eight-Deities Section in the Codex Laud
- 9:20 Robert L. Hall, Water-Water Everywhere: Atl-Atl Fingerholes as Eye Metaphors in Mesoamerica and North America
- 9:40 Michael W. Spence, The Organization of Obsidian Production in Teotihuacan
- 9:50 Susan T. Evans, Processual Change in Political Structure in the Basin Of Mexico, Late Horizon
- 10:10 Cynthia Heath-Smith, Resource Utilization and Site Location in Western Morelos, Mexico: A Diachronic Perspective
- 10:30 Michael E. Smith, Postclassic Settlement Patterns in Western Morelos, Mexico
- 10:50 Louise Paradis and Evelyne Cossette, Settlement Patterns in the Tepecoacuilco River Drainage, Guerrero, Mexico
- 11:00 Michele Hayward, Improved Method of Record Linkage Using Colonial Mexican Parish Records

(44) Symposium: THE BIOGEOGRAPHY OF THE BLACK MESA ANASAZI

Wisconsin Room
Organizers: George J. Gumerman and Shirley Powell
Chairperson: George J. Gumerman

Participants:

- 9:00 Jeffrey Dean, Dendroclimatic Variability and Demography, Black Mesa
- 9:20 Michele Seme', Measuring Hunting Selectivity in an Archaeological Context, An Example from Black Mesa, Arizona
- 9:40 Robert E. Murry, Jr., Vegetational Change on Anasazi Sites, Black Mesa, Arizona
- 10:00 Debra L. Martin, Alan C. Swedlund and George J. Armelagos, Population Dynamics, Resources and Skeletal Biology on Black Mesa
- 10:20 Shirley Powell, Food Storage and Environmental Uncertainty: An Example from Black Mesa, Arizona
- 10:40 Stephen Plog, Organization and Change in Northern Arizona
Discussants: Robert C. Euler, David P. Braun

(45) Symposium: THE MEADOWCROFT ROCKSHELTER ROLLING THUNDER REVIEW: LAST ACT

Roosevelt Room
Organizer and Chairperson: J. M. Adovasio

Participants:

- 9:00 R. C. Carlisle, J. M. Adovasio, J. Donahue, P. Wiegman and J. Guilday, An Introduction to the Meadowcroft/Cross Creek Archaeological Project: 1973-1982
- 9:20 D. Beynon and J. Donahue, The Geology and Geomorphology of Meadowcroft Rockshelter and the Cross Creek Drainage, Washington County, Southwestern Pennsylvania
- 9:40 R. Fryman, Prehistoric Settlement Patterns in the Cross Creek Drainage, Washington County, Southwestern Pennsylvania
- 10:00 R. Stuckenrath, J. M. Adovasio and J. Donahue, The Stratigraphy, Cultural Features and Chronology at Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania

- 10:20 P. T. Fitzgibbons, Lithic Artifacts from Meadowcroft Rockshelter and the Cross Creek Drainage, Washington County, Southwestern Pennsylvania
- 10:40 F. J. Vento and J. Donahue, Lithic Raw Material Utilization at Meadowcroft Rockshelter and the Cross Creek Drainage, Washington County, Southwestern Pennsylvania
- 11:00 R. L. Andrews, Perishable Artifacts from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 11:20 W. C. Johnson, Ceramics from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 11:40 J. Guilday and P. Paramlee, Vertebrate Faunal Remains from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania

(46) General Session: PERUVIAN PREHISTORY

Hoover Room

Chairperson: Jonathan D. Kent

Participants:

- 8:00 Michael A. Malpass, Pre-Ceramic Subsistence Technologies Along the North-Central Coast of Peru
- 8:20 Richard E. Daggett, The Nature of the Early Horizon in the Nepeña Valley, North Coast of Peru
- 8:40 Patricia Netherly and Tom Dillehay, Forest and Coast: Implications of Recent Research in the Upper Zana Valley of Northern Peru
- 9:00 Abelardo Sandoval, Chavin Political Administration in the Callejon de Huaylas, Peru
- 9:10 Izumi Shimada and Carlos Elera, Stylistic Interaction and Syncretism During the Middle Horizon in North Peru
- 9:30 Charles M. Hastings, Highland Settlements in Eastern Forests: Late Intermediate Colonization of the Central Peruvian Ceja de Montaña
- 9:50 Jonathan D. Kent, Osteon Population Density and Age in South American Camelids
- 10:10 Jane Wheeler, Lamoid Domestication and the Early Development of Pastoralism in the Central Peruvian Andes
- 10:30 William H. Isbell, Emergence of State Administration at Huari, Peru
- 10:50 Christine Brewster-Wray, Form and Function in Huari Architecture
- 11:10 Anita G. Cook, The Distribution of Imperial Iconography in the Central Andes
- 11:30 Patricia J. Knobloch, Ceramic Style and Chronology at Huari, Peru
- 11:50 Lynda E. Spickard, Origin of Andean State Administrative Architecture
- 12:10 Katharina Schreiber, Changing Settlement Patterns in the South-Central Highlands of Peru

(47) General Session: THE PHYSICAL SCIENCES AND ARCHAEOLOGY

Wilson Room

Chairperson: Allan E. Kane

Participants:

- 8:00 Francis P. McManamon, Site Discovery Techniques in Areas of Dense Ground Cover
- 8:20 Jonathan E. Reyman, Adaptation, Astronomy and Architecture at Mesa Verde
- 8:40 Joseph Schuldenrein, Geoarchaeological Investigations at Rucker's Bottom, A Multi-component Site at the Richard B. Russell Reservoir, Georgia
- 9:00 Deborah L. Nichols and Robert Huggins, Preliminary Magnetic Reconnaissance of Pre-ceramic Sites in Northeastern Arizona
- 9:20 Randall H. McGuire and Robert S. Sternberg, A Revision of the Virtual Geomagnetic Pole Curve for the U.S. Southwest (AD 1100-1400) and Its Implications for Archaeomagnetic Dating
- 9:40 Jeffrey Eighmy, J. Jolly Hathaway and Allen E. Kane, Extension of the Southwest Virtual Geomagnetic Pole Curve (AD 700-900) Based on Dolores Archaeological Project Results 1978-1980

(48) General Session: C.R.M. AND CONSERVATION ARCHAEOLOGY: ISSUES AND RESULTS

Wilson Room

Chairperson: Francis A. Riddell

Participants:

- 10:20 Dennis E. Lewarch, Conservation and Exploitation in Mesoamerican Archaeology: An Assessment
- 10:40 Francis A. Riddell, Archaeology and the California Park System
- 11:00 Gary H. Nurkin, The Conservation of Archaeological Resources: Federal Legislation
- 11:20 Alice W. Portnoy, Client Oriented Art and Archaeology: Lessons From the Past

(50) Symposium: PREHISTORIC PHYSICAL ENVIRONMENTS: CLUES FOR THEIR INTERPRETATION

Minnesota Room

Organizers and Chairperson: Julie K. Stein and William R. Ferrand

Participants:

- 9:00 Julie K. Stein, Interpreting Sediments in Cultural Settings
- 9:20 William R. Ferrand, Rockshelter and Cave Environments
- 9:40 Bruce G. Gladfelter, Alluvial Contexts of Archaeology: What Does It All Mean?
- 10:00 Fekri A. Hassan, Fluvial Systems in Arid Regions
- 10:20 Curtis E. Larsen, Geoarchaeological Interpretation of Lakeshore Environments
- 10:40 John C. Kraft, Marine Environments (Littoral Regions)
- Discussants: R. Bruce McMillan, Jack D. Donahue

SATURDAY AFTERNOON, APRIL 17, 1982

12:00- CONTRACT ARCHAEOLOGY

1:00

Illinois Room

Organizer: James E. Fitting

Informal discussion by/for contracting archaeologists on current issues facing the profession.

(41) (Continued) Symposium: INDUSTRY AND ARCHAEOLOGY

Illinois Room

Organizers and Chairpersons: James E. Fitting and James J. Shive

Participants:

- 1:30 William Chilson, The Utility Industry
- 1:50 G. Robert Adams, The Highway Industry
- 2:10 James J. Shive, The Needs of Industry

(45) (Continued) Symposium: THE MEADOWCROFT ROCKSHELTER ROLLING THUNDER REVIEW: LAST ACT

Roosevelt Room

Organizer and Chairperson: J. M. Adovasio

Participants:

- 1:30 P. W. Sciulli, Human Remains from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 1:50 K. Lord, Invertebrate Faunal Remains from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 2:10 K. Cushman, Floral Remains from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 2:30 E. Skirboll, Analysis of Constant Volume Samples from Meadowcroft Rockshelter, Washington County, Southwestern Pennsylvania
- 2:50 J. D. Applegarth and V. Cowin, Excavations at Cross Creek Village (36WH293) and the Avella Mound (36WH415), Washington County, Southwestern Pennsylvania
- 3:10 J. M. Adovasio, J. Donahue, J. D. Gunn and R. Stuckenrath, The Meadowcroft Rockshelter/Cross Creek Archaeological Project: Retrospect 1982
- Discussants: H. M. Wormington, G. Frison, R. Shutler

(49) General Session: LITHIC ANALYSIS: NEW APPROACHES

Michigan Room

Chairperson: John Montgomery

Participants:

- 1:30 Barbara A. Voytek, Intensification in the Exploitation of Non-Subsistence Resources
- 1:50 Preston S. Staley and Thomas G. Wynn, A Comparison of Two Methods for Measuring Plan Form of Lithic Artifacts
- 2:10 Michael C. Muse and T. Stocker, Life History of Obsidian Artifacts from Peñon del Río: Results of Preliminary Analysis
- 2:30 Peter A. Gendel, A Test of Microwear Analysis on Experimental Stone Tools
- 2:40 Deborah R. Sabo, Use-Wear Analysis of a Michigan Chert

- 2:50 Brian M. Butler and Neal H. Lopinot, Debitage Variation in Archaic Period Sites in the Lower Ohio Valley
 3:10 Kenneth L. Feder, Whoops! The Use of Mistakes in Lithic Analysis
 3:30 Michael S. Foster and Ronna J. Bradley, A Functional Analysis of an Apache Utilized Glass Assemblage
 3:50 John C. Whittaker, Social Implications of Projectile Point Variation
 4:00 John L. Montgomery, Lithic Assemblage Variability Among Contemporaneous Anasazi Households

(51) General Session: RECENT MAYA RESEARCH

Iowa Room

Chairperson: Fredrick W. Lange

Participants:

- 1:30 Robert L. Rands and Ronald L. Bishop, Exchange and Localized Distribution of Maya Fine Orange-Fine Gray Ceramics
 1:50 Frederick Wiseman, Phytolith Evidence for Swidden-Like Agriculture in the Maya Lowlands
 2:10 Paul F. Healy, An Ancient Maya Dam in the Cayo District, Belize
 2:30 Kenneth L. Brown, The Development of the Quiché Maya: Are the Ethnohistoric Sources Really a Bible?
 2:50 William R. Fowler, Jr., The Southeast Patio Group at Cihuatán, El Salvador
 3:00 Laura J. Kosakowsky and Fred Valdez, Jr., Rethinking the Northern Belize Formative Ceramic Chronology
 3:20 Beverly A. Mitchum, Xaman Kiwik: Changing Functions in a Small Early Classic Community
 3:30 James F. Garber, Long Distance Trade and Regional Exchange at the Maya Community of Cerros in Northern Belize
 3:50 Eric C. Gibson and Harry J. Shafer, Late Classic Maya Settlement at Kichpanha, Northern Belize
 4:10 Erwin Roemer, A Late Classic Lithic Workshop at Colhá, Belize: Problems of Analysis
 4:30 Linnea H. Wren, Power and Politics: An Iconographical Study of the Sculptures and Murals of the Great Ball Court at Chichén Itzá

(52) Symposium: INNOVATIONS IN ARCHAEOLOGICAL APPLICATIONS OF REMOTE SENSING, AERIAL PHOTOGRAPHY AND GROUND-BASED PHOTOGRAMMETRY

Minnesota Room

Organizer and Chairperson: Paul W. Hoag

Participants:

- 2:45 Paul W. Hoag, Archaeological Photography: The State of the Art
 3:05 Sarah Dennett and Hans Muessig, Mapping Archaeological Sites Using Ground-Based Photogrammetry
 3:25 James Grady, Small Format Aerial Photography for the Cost-Conscious Archaeologist
 3:45 Stephen R. Potter, Low Budget and Low Altitudes: Aerial Photography and Archaeological Survey in Tidewater, Virginia
 4:05 K.-Peter Lade, The Monitoring and Detection of Archaeological Resources Through the Use of Landsat Digitized Multispectral Data
 4:25 James I. Ebert, Remote Sensing as an Integrative Methodology for Archaeology
 Discussant: Glen E. Rice

(53) General Session: PALEOINDIAN AND HUNTER-GATHERER STUDIES

Wisconsin Room

Chairperson: Fred Schneider

Participants:

- 1:30 Timothy A. Smith, Spatial and Lithic Analysis of the Dry Creek Site, A 10,000-Year-Old Camp in Central Alaska
 1:50 John W. Foster, Francis Riddell, G. James West, Gene Begg and William Olsen, The Witt Site: A Dated Fluted Point Assemblage from the Surface Shoreline of Tulare Lake, California
 2:10 D. Gentry Steele, Patterns of Human Predation
 2:30 Fred Schneider, An Interpretation of Paleoindian Cultures in North Dakota
 2:50 Marvin Kay and Russell Graham, Clovis Adaptations in the Midwest: The Prospects from Kimmswick, Eastern Missouri
 3:10 Dan Elliot, Steven Brandt and Thomas Gresham, Paleoindian Occupation of Middle Georgia: The Taylor Hill Site

- 3:20 Robert Bettinger, Three Occupation Sites in Owens Valley, Eastern California and Their Implications for Great Basin Prehistory
 3:40 Cynthia Irwin-Williams, Archaeological Visibility and the Recognition of Patterned Behavior for Desert Hunters and Gatherers
 4:00 Katherine Spielmann, The Role of Subsistence Exchange in Late Prehistoric Southern Plains Hunter-Gatherer Adaptations

(54) Symposium: ARCHAEOLOGISTS AND CONSERVATORS: THE PRESERVATION OF ARCHAEOLOGICAL COLLECTIONS

Hoover Room

Organizers and Chairpersons: M. Lee Douthit and Constance S. Silver

Participants:

- 1:30 M. Lee Douthit, Introduction—Archaeologists
 1:40 Constance S. Silver, Introduction—Conservators
 1:50 M. Lee Douthit, An Archaeological Perspective in the Field Treatment of Artifacts
 2:10 Bettina Raphael, Conservation in the Field
 2:30 Dee Ann Story, The Management and Maintenance of Archaeological Collections: An Example
 2:50 Margo Surovik-Bohnert, Collections Management for the Dolores Archaeological Project
 3:10 Kate Singley, Cost-Efficient Field Conservation
 3:30 E. Mott Davis, Between the Ground and the Laboratory: The Collection and Curation of Archaeological Specimens for Special Analysis
 3:50 Solveig Turpin, The Rock Art of Seminole Canyon, Texas
 4:10 Constance S. Silver, Rock Art as Art: An Approach to a Difficult Conservation Problem
 Discussants: Allen Bohnert, E. Mott Davis

(55) General Session: PREHISTORY IN THE EASTERN USA

Wilson Room

Chairperson: Duane C. Anderson

Participants:

- 1:30 Mary Ann Palmer-Niemczyk, Archaeology and the Study of Primitive Social Organization
 1:50 Charles Kolb and David Grettler, The W.P.A. Erie County, Pennsylvania Archaeological Survey, 1936-1937: "Reconstruction" and Analysis
 2:10 Jonathan E. Bowen, An Introduction to the Sandusky Bay Archaeological Project in Northern Ohio
 2:20 A. M. Cantwell, Panpipes in Eastern North America
 2:30 Anne F. Rogers, An Interpretation of the Prehistoric Occupation of Eight Rockshelters in Southwestern Virginia
 2:40 David J. Hally, The Vessel Assemblage in Archaeological Research

(56) General Session: RECENT ARCHAEOLOGICAL RESEARCH IN THE WESTERN U.S.A. AND CANADA

Wilson Room

Chairperson: Duane C. Anderson

Participants:

- 3:20 James M. Savelle, The Nature of the Thule Eskimo Occupations in the Boothia Peninsula/King William Island Region, Northwest Territories
 3:30 William R. Hildebrandt, Native Hunting Adaptations on the North Coast of California
 3:50 Duane C. Anderson, Models of Fremont Culture History: An Evaluation
 4:10 Kevin W. Thompson, Analysis and Implications from an Archaic Rockshelter in North-Central Colorado
 4:20 Alice M. Emerson, A Plains Application of Binford's Models of Faunal Assemblage Composition
 4:40 Ronna J. Bradley, Resource Utilization at La Cabrana: An El Paso Phase Pueblo in South-Central New Mexico

(1) UNDERSTANDING PREHISTORIC SETTLEMENT-SUBSISTENCE IN WESTCENTRAL ILLINOIS. This symposium presents current research on aspects of prehistoric settlement-subsistence in westcentral Illinois, a region which includes the lower Illinois River valley and part of the central Mississippi River valley. Typically, these papers range from biological assessments of the health of prehistoric populations to resource exploitation and site formation processes. Information used in these papers comes from the now-active F.A.P. 408 Central Illinois Expressway project, but also included are studies accumulated during 25 years of archaeology conducted by Northwestern University and the Kampsville Archeological Center. Several papers, notably those on geomorphology, paleozoology, paleobotany, and bioanthropology, are overviews documenting change and continuity in the prehistory of this region. The other papers are more narrowly focused on certain aspects of prehistoric settlement-subsistence and are frequently chronological-ly specific.

(2) BRIDGING THE ATLANTIC: MAJOR DEVELOPMENTS IN LATE PLEISTOCENE CULTURE HISTORY, AND ALTERNATIVE APPROACHES TO THE EXPLANATION OF CULTURE CHANGE. This symposium frames a discussion of American and European archaeological approaches to the study of culture change. Despite recent communication, an explicit examination of the theoretical and methodological underpinnings of these approaches has yet to be forthcoming. The papers involved address the theoretical orientation and associated methodologies used in addressing culture change questions, thereby providing an innovative base for new research. One particular aspect involves the incorporation of social variables into archaeological models, with a discussion of the American processual school, and European paleoeconomy and marxist approaches. The session is divided into two sections: the first involves alternative interpretations of culture historical developments; the second addresses explanatory approaches.

(3) ARCHAEOLOGY IN NORTHERN BELIZE. Significant progress has taken place in Maya archaeology over the last 25 years. Especially noteworthy is the variety of research in northern Belize, particularly that of the past decade. The symposium provides several project summaries as well as topical discussions concerning northern Belize. Chronological sequences of artifacts begin with non-Maya materials ca. 9000 BC, and continue well into the various Maya periods ending in the Late Postclassic (17th century). Thus, a capsule view of prehistoric northern Belize is made available via the cooperation and communication among the various archaeological projects of the region.

(4) THE MEANING OF ARCHITECTURAL VARIABILITY AND SPACE USE. This symposium is concerned with the development of methods to determine the meaning of architectural variability and site structure in the archaeological record. Papers focus on the relationships between inter-site and intrasite structure and social organization, labor organization, symbolism, subsistence activities and space use. Many potential ways to approach an understanding of this architectural and site structural variability are presented, including ethnoarchaeology, behavioral studies, the development of cross cultural measures, cognition models and dimensional analyses. These papers relate current ideas in anthropology to the archaeological domain and consider the relative usefulness of the various approaches.

(5) CHANGE AND STABILITY IN THE HOHOKAM CULTURAL SYSTEM: SALT-GILA AQUEDUCT, CENTRAL ARIZONA PROJECT, ARCHAEOLOGY. The Salt-Gila Aqueduct Project provides an opportunity to reexamine change in Hohokam cultural system, and in particular the transition to the Classic Period. It has often been proposed that external factors forced radical change at about AD 1100. Our data suggest Hohokam modification of social and economic strategies not in response to stress but to develop and perpetuate important elements of the existing system. Evidence of Preclassic economic and social complexity and local diversity, as well as new data regarding the appearance of "Classic" characteristics and the survival of "Preclassic" characteristics, demonstrates continuity in the development of the Hohokam.

(6) CULTURAL AND BIOLOGICAL CHANGE AT THE MIDDLE TO UPPER PALEOLITHIC TRANSITION. The last major cultural and biological transition in human evolution was the development of the Upper Paleolithic from the Middle Paleolithic and the contemporaneous evolution of the Neanderthals into modern-appearing humans. The papers in this symposium will discuss the nature and adaptive significances of this transition, or its equivalent, in regions of Africa, the Near East and Europe. They will draw upon artifactual, faunal, human paleontological and contextual data to provide an overall characterization of the origins of modern human behavioral patterns from the more archaic ones of the early Upper Pleistocene.

(11) AMERICAN BOTTOM ARCHAEOLOGY: RESULTS OF THE FAI-270 ARCHAEOLOGICAL MITIGATION PROJECT. Archaeological research in the American Bottom has centered on the

Cahokia site. The Federal Aid Interstate highway 270 provided an opportunity to explore 82 sites along a 34 km sample of floodplain. The research design emphasized an excavation strategy aimed at the recovery of prehistoric community plans. With the exception of Cahokian Mississippian occupations, little excavated data was available for any other time period. This symposium will present the results of analysis for occupations from the late Archaic through Oneota. New data and interpretations dealing with bioanthropology, paleoethnobotany, archaeozoology, and geomorphology will be presented.

(13) TOWARDS A GENERAL THEORY OF HUNTER-GATHERER TECHNOLOGY: EFFICIENCY AND ECONOMIZING STRATEGIES. Archeological theory explaining the variability in hunter-gatherer technology is notably lacking. The papers in this symposium are an attempt to explain patterns of resource procurement, manufacture, use and discard among prehistoric hunter-gatherers. Two broad topics are considered: the role of scheduling as a result of constraints on available time (efficiency) and technological response to constraints on preferred raw materials (economy). A wide geographic and temporal range of data is used in testing hypotheses about efficient and economic behavior in hunter-gatherers.

(14) CRM: MANAGING THE RESOURCE. Discussions on cultural resource management generally have focused on the laws and excavation work performed. The other aspect, preservation of the resource, is rarely discussed. However, simply saving a site from the bulldozers is not enough; natural elements, pot hunters and privately funded projects can still destroy a site. Preservation must involve management—cultural resource management. This symposium will focus on problems of preservation and some methods and approaches being taken to manage our dwindling resources.

(15) RECENT DEVELOPMENT IN HOHOKAM ARCHAEOLOGY. Recent work in Hohokam archaeology has forced a reevaluation of preexisting schemes of time measurement, site definition and interpretation which have affected the way archaeologists investigate culture change. Primarily these changes are due to an expanded knowledge of the range of variability between and within Hohokam sites. Papers presented treat data on both inter- and intrasite scales for defining changes in the demographics and sociopolitical system of the Hohokam. Of general interest to archaeologists are the discussions of theoretical aspects of rates of change, causes of change, and of the relation of material patterning to prehistoric behavior.

(16) NATIONAL PARK SERVICE ARCHAEOLOGY IN THE MIDWESTERN UNITED STATES. The National Park Service has sponsored or conducted a wide range of archaeological investigations in the midwestern United States during the last four years. These studies have emphasized compliance with historic preservation legislation within a research oriented framework. The papers in this symposium represent a diverse range of topics relating to historic and prehistoric archaeology throughout the midwest, including survey, site testing, large scale data recovery and reanalysis of data from previous investigations. The papers contribute individually, and collectively, to a better understanding of midwestern archaeology.

(17) UNPUBLISHED ARTIFACTS FROM THE CENOTE OF SACRIFICE, CHICHÉN ITZÁ, YUCATÁN, MEXICO. This symposium will discuss and illustrate those categories of artifacts dredged from the Cenote between 1904 and 1907 that are stored in the Peabody Museum, Harvard University, and have never been published as a collection. These include over 700 textile fragments, basketry, about 100 wooden objects, worked stone—both chipped and ground, marine materials, bone artifacts, whole ceramic vessels and associated copal, rubber, gourds and other vegetal materials. This collection will be compared with another removed from a cenote at Dzibilchaltun, Yucatán to provide an analogous, if probably not contemporary, ritual situation. Other reports will discuss the various conclusions deriving from techniques of physical and theoretical analysis that have been applied to this artifactual collection which is central to an understanding of the Postclassic Maya.

(18) CURRENT RESEARCH IN AFRICA AND THE LEVANT: COMPARISONS AND CORRELATIONS. Recent field work in Africa and the Levant has led to a reassessment of long-held interpretations about prehistoric adaptive strategies and cultural development. These papers focus on regions where new evidence has particularly influenced this reevaluation. The emergence of African cattle pastoralism, early cereal domestication, the regional development of Upper Paleolithic technologies and the spatial organization of prehistoric populations in several areas are among the topics critically examined. Since Africa and the Levant contain much of the earliest evidence for appearance of historically significant cultural advances, these papers offer new bases for modeling the processes through which they appeared.

(19) ENVIRONMENTS AND EXTINCTIONS: MAN IN LATE GLACIAL NORTH AMERICA. In recent years there has been a marked increase in the interest and understanding of man's adaptation to the Late Glacial environments of North America. Recognizing this, the symposium will examine

Late Pleistocene environments, and the causes and consequences of Late Pleistocene extinctions. Under the broader issue of environments, papers will be presented that deal with problems of environmental reconstruction, taphonomy, dating and man/environment relations. Under the more specific issue of extinctions, papers will focus on the question of man's impact on the vertebrate fauna of North America.

(24) **ADVANCES IN OBSIDIAN HYDRATION DATING.** Symposium sponsored by the Society for Archaeological Sciences. Symposium followed by an address by Irwin Scollar.

(28) **CURRENT RESEARCH AND TRENDS IN NORTH SLOPE ARCHAEOLOGY.** In recent years, research on Alaska's North Slope has responded to the increasing pace of industrial development and changing land ownership. Increasingly, archaeologists are placed in the forefront of controversy, amidst questions of native land use, cultural values and data inventory and salvage. As a result of these trends, significant advances have been made in our understanding of this vast and poorly-understood region. Although work continues to grapple with persistent problems of cultural history, much of the current research has attempted to resolve some of the more complex processual problems inherent in regional syntheses and interpretation.

(29) **CULTURAL RESOURCE MANAGEMENT AND THE U.S. ARMY CORPS OF ENGINEERS.** This symposium addresses cultural resource management in the Corps of Engineers. Actions undertaken by and under the jurisdiction of the Corps affect a wide range of cultural resources requiring management programs which are both innovative and multifaceted. The papers presented deal with a variety of administrative, theoretical and methodological approaches from the perspective of agency archaeologist and contractor. A historic overview will provide background information. Specific projects are utilized as focal points for discussions of contracting procedures, agency coordination, integrated research designs and management studies.

(30) **CURRENT PROBLEMS IN THE ARCHAEOLOGY OF COASTAL ECUADOR.** This symposium presents previously unreported recent and ongoing research on the coast of Ecuador. Each paper deals with a major topic within a specific period and area. The important north and central coasts, until now virtually unexplored and unreported, are represented by two papers, one discussing a complex Valdivia site on the north coast, the other describing a large Manteño installation on the central coast. The other papers present data and research done in Guayas Province on the south coast.

(31) **THE SOCIO-POLITICS OF ARCHAEOLOGY.** This symposium will view archaeology as a social institution which enculturates its members to interact in structured ways with its academic and sociopolitical context. As an institution, archaeology is forced to serve the goals of the larger society which supports it while it also mirrors the norms, prejudices, politics and economic structure of that society. From this perspective, we will consider the extent to which archaeological developments are shaped by the values and contradictions in the larger society, how our interpretations support or undermine ideological beliefs and how societal roles and ranks affect professional relationships among archaeologists.

(32) **URBAN ARCHAEOLOGY IN THE UNITED STATES.** This symposium explores certain ongoing urban archaeological projects in the United States. The number of methodological and theoretical advances, and the amount of substantive information, have grown rapidly in recent years. Topics discussed include the contributions urban archaeology can make and has made to the understanding of urban development, ethnicity and other historic issues, the formation of urban sites and the preservation of the archaeological record in urban settings, and the relevance of urban archaeology in today's urban world.

(33) **NATIONAL ARCHAEOLOGICAL RESEARCH TOPICS: AN INITIAL FORMULATION.** As a method of establishing priorities for the expenditure of federal and other funds on archaeological data recovery, the development of National Archaeological Research Topics has recently been under discussion among several federal agencies responsible for segments of the national historic preservation effort. This symposium will consider the need for such topics, and how the federal data recovery program could be organized around them, and will present several preliminary examples of what such topics might be.

(34) **THE LANGE/FERGUSON (39SH33) CLOVIS KILL-BUTCHERY SITE: OF MEN, MAMMOTHS AND MICE.** The site represents the first substantiated evidence of Clovis hunters in direct association with butchered bones of mammoth and other megafauna in the Dakotas. Several lines of evidence, both taphonomic and artifactual (human) exist to corroborate the incidence of killing and butchering activity at the Lange/Ferguson (39SH33) Site. Ecological and climatic implications of the late Wisconsin/early Holocene as they affected the prehistoric hunters and megafauna are considered through the recovered vertebrate fossils, fossil mollusks and reconstructed geologic and soil data at the site.

(35) **LITHIC TECHNOLOGY IN THE LATE PLEISTOCENE.** Previous symposia and edited volumes devoted to lithic technology have tended to omit temporal or environmental restrictions on the assemblages represented. The present symposium is intended to bring together investigators concerned with such studies as they relate Pleistocene cultures. Speakers will address topics including use wear, reconstitution analysis, intersite spatial distribution of tools and debitage, silica residues on stone tools and inferences concerning prehistoric motor habits. While it is primarily devoted to North American Paleoindians, particularly the northeast, Old World topics are included in order to stimulate dialogue on relevant issues.

(36) **PEER POLITY INTERACTION AND SOCIOPOLITICAL CHANGE.** The unifying concept is peer polity interaction defined in the initial paper by Renfrew. Each contributor takes a specific instance of sociocultural change generally of increased complexity where peer polity interaction is a crucial process. The cases discussed by Cherry and Wright involve initial state formation. Barnes, Braun and the Champions consider changes to a level of complexity perhaps below that of the state; Shennan, an instance at a lower organizational level. Both Sabloff and Hodges consider changes in the aftermath of state collapse or recession. The geographical range is wide to initiate a dialogue towards coherent generalization.

(37) **STATISTICAL ANALYSIS OF ARCHAEOLOGICAL DATA STRUCTURES.** Application of an analytical technique to data can yield accurate and pertinent results only if the assumptions which the technique makes about the structure of the data are logically consistent with the empirical structure of the data and its expectable structure based upon some guiding theoretical framework. The importance of bridging data, technique, and theory is stressed by papers which: (a) describe the nature of various kinds of archaeological data, (b) evaluate the assumptions made by commonly-used analytical techniques, (c) introduce new techniques having assumptions more consistent with the structure of archaeological data and (d) describe data screening methods for bringing data and technique into concordance. Spatial analysis, lithic analysis, regional exchange and areal sampling are the specific areas of application.

(40) **THE SMALL-SCALE SURVEY REVISITED.** In 1978, at the SAA meeting in Tucson, a symposium was held which focused on the problems and integration of small-scale archaeological surveys. Today's symposium offers an opportunity for up-to-date discussion regarding the philosophical, methodological, technological and managerial problems presented in 1978. Representatives of state and federal agencies, as well as industry and private interests, offer a broad range of response to questions previously raised. Although polemic points of view become apparent, they can only serve to encourage the kinds of debate and discussion that will bring about adequate and timely solutions to problems of the small-scale archaeological survey.

(41) **INDUSTRY AND ARCHAEOLOGY.** Archaeological meetings are generally characterized by archaeologists talking to other archaeologists. In this symposium, representatives of a number of key industries who deal with archaeologists explain the needs of their programs and what they need from archaeologists in order to expedite their own work schedules and mission goals. The key participants are representatives of the oil and gas, utility (siting and routing) and highway construction industries.

(43) **IDEOLOGY AND THE ARCHAEOLOGICAL RECORD.** The aim of this session is to investigate the relationship between ideology and material culture. Ideologies can either help to make the world known to people or they may serve to mask the actual nature of extant social relations and legitimate the interests of specific groups or individuals. This has important implications for the interpretation of material culture because artifacts can be used both to represent, misrepresent and represent and misrepresent simultaneously. All the papers (whether theoretical, ethnographic or archaeological) in this session work towards a clearer conception of the relationship between the meanings of social actions and the uses of material culture.

(44) **THE BIOGEOGRAPHY OF THE BLACK MESA ANASAZI.** Numerous environmental, ecofactual, osteological, artifactual and settlement pattern analyses have been conducted with data collected by the Black Mesa Archaeological Project in northeastern Arizona since 1968. The results of these analyses are integrated to present a complete description of environmental and cultural change on prehistoric Black Mesa. Further, models that predict the interrelationships among environmental perturbation, changing resource availability, nutritional responses, demographic change and organizational responses to these changes are evaluated.

(45) **THE MEADOWCROFT ROCKSHELTER ROLLING THUNDER REVIEW: LAST ACT.** From 1973 to present, the Department of Anthropology, University of Pittsburgh, has conducted multidisciplinary research into the prehistory, paleoecology, geology and geomorphology of Meadowcroft Rockshelter (36WH297) and the Cross Creek drainage of Washington County, southwestern Pennsylvania. These studies have produced an enormous data base that is in the final stages of scrutiny at the University of Pittsburgh and at a series of cooperating institutions

in the United States. The data indicate that Meadowcroft Rockshelter and the Cross Creek watershed were utilized aboriginally from ca. 14-17,000 BC and extending into the Historic Period. Additionally, data exist to detail the geomorphological history of both the rockshelter and the drainage as well as the vicissitudes of the floral and faunal record.

(50) PREHISTORIC PHYSICAL ENVIRONMENTS: CLUES FOR THEIR INTERPRETATION. In recent years archaeologists have recruited geologists to reconstruct the physical environment of a particular research area. Archaeologists usually request a specific product, i.e., a regional picture of the natural resources available to prehistoric people. But geologists traditionally reconstruct past geomorphic settings at an areal and temporal scale unacceptably large for archaeological purposes. This symposium, which attempts to acquaint archaeologists with the geologist's perspective and demonstrate the potential of geologic research, should enhance communication between the two disciplines. Each paper, focusing on a physical setting often associated with prehistoric sites, will include a discussion of the data needed to reconstruct the environment, approaches to data interpretation, and a caution regarding their limitations.

(52) INNOVATIONS IN ARCHAEOLOGICAL APPLICATIONS OF REMOTE SENSING, AERIAL PHOTOGRAPHY, AND GROUND-BASED PHOTOGRAMMETRY. Recent innovations in archaeological use of remote sensing, vertical and oblique aerial photography, and ground-based stereophotogrammetry are described. Practicality, cost effectiveness, reliability and limitations are explored. The place of such techniques within general archaeological practice is emphasized. Connections between the various technical methodologies are detailed. Integrated systems of photography, interpretation, and metrics are discussed and some nonmetric uses of archaeological photography are considered. Emphasis is upon the feasibility of archaeological photography, including high-technology imaging, as an information gathering method for archaeological research.

(54) ARCHAEOLOGISTS AND CONSERVATORS: THE PRESERVATION OF ARCHAEOLOGICAL COLLECTIONS. The preservation, storage and curation of archaeological materials is of vital importance to contemporary and future archaeologists. With the aid of modern technology and trained conservators, archaeological materials can be stabilized, preserved and stored for future study. However, many archaeologists do not take advantage of the possibilities in conservation, and many artifacts are being damaged or lost because of this lack. The discussion of conservation from the archeologists' and the conservators' point of view will be aimed at practical solutions, and will discuss several cases.

ABSTRACTS OF PAPERS

Abbott, David R. (Arizona State Museum) VARIABILITY IN REDWARE MANUFACTURE AMONG THE HOHOKAM. Issues about the origin and development of Hohokam redwares have been debated for many years. The Salt-Gila Aqueduct project has dramatically expanded the assemblage of Hohokam redwares, shedding new light on several issues. The morphological and contextual variability of the redwares from several Sedentary and Classic Period sites are analyzed to address questions concerning redware origins among the Hohokam, their loci of manufacture, and the temporal sensitivity of particular redware attributes. (5)

Adams, E. Charles (Museum of Northern Arizona) CULTURE CHANGE AMONG THE HOPI AND ITS REFLECTION IN THE BUILT ENVIRONMENT. Patterns in the built environment of the Hopi Indians have changed dramatically during the past century. These changes are due to contact with Euro-American culture. Patterns at both the household and the community level have shifted from the traditional western Pueblo pattern characteristic through the mid-19th century to one nearly identical to the dominant Euro-American culture. The evolution of this change and underlying social and economic factors are traced. (4)

Adams, G. Robert (Michigan Department of Highways and Transportation) THE HIGHWAY INDUSTRY. Archaeological investigations undertaken as a part of the highway construction process are required to meet the specific needs of the industry. This paper will include a discussion of the objectives of the agencies responsible for highway construction, the means by which these objectives are accomplished and the role of archaeology in this process. Examples of problems resulting from the failure of archaeologists to understand these needs are presented as illustrations. The paper concludes with recommendations to archaeologists on how they can better serve the needs of the agencies responsible for highway construction. (41)

Adams, Richard E. W. (Texas, San Antonio) THE ORIGINS OF MAYA CIVILIZATION IN N. BELIZE: PRESENT EVIDENCE. A long and precocious sequence of development in Belize begins ca. 2600 BC and culminates in Classic Maya civilization by 250 AD. Farming villages appear by 2600 BC. Small ceremonial centers seem to be in existence by 1500 BC. By 1000 BC many of the later features of Classic Maya civilization are already developing, together with the implied ritual and social structure based on genealogical prestige. Huge temples are built at Cerros and Lamanai in the Late Preclassic. Specialized sites appear in the same period, including a port and a stone tool factory. Intensive farming in the form of drained fields and canals are extant. Rank order and rank size analysis of 17 centers from the period seem to reflect political and economic hierarchies. Explanatory factors are examined. (3)

Adovasio, J. M. (Pittsburgh), J. Donahue (Pittsburgh), K. Cushman (Dravo) and J. D. Gunn (San Antonio) PALEOENVIRONMENTAL RECONSTRUCTION AT MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, PENNSYLVANIA. Systematic collection and extensive floral, faunal, geological, geomorphological and sedimentological analysis of samples between 1973 and the present have delineated the local paleoenvironment of Meadowcroft Rockshelter and the Cross Creek drainage in the Upper Ohio Valley. Floral remains are present in the site's deposits throughout the entire 16,000-19,000 year occupational sequence. Faunal remains from the post-9500 BC levels to the uppermost levels of the site are also extensive. These data indicate that despite "low-level" fluctuations, the climatic setting at the site has remained more or less stable since ca. 9000 BC. An environment not substantially dissimilar to that of today is seen to extend into the terminal Pleistocene. This interpretation is also supported by the wide range of geological analyses employed. The methodology of data collection at Meadowcroft is detailed, and the utility of these methods in paleoenvironmental reconstruction is summarized. (19)

Adovasio, J. M. (Pittsburgh), J. Donahue (Pittsburgh), J. D. Gunn (Texas/San Antonio), R. Stuckenrath (Smithsonian) THE MEADOWCROFT ROCKSHELTER/CROSS CREEK ARCHAEOLOGICAL PROJECT: RETROSPECT 1982. The 1973-1978 excavations and attendant analyses at Meadowcroft Rockshelter as well as the concomitant survey, excavations and ancillary studies conducted elsewhere in the Cross Creek drainage have generated what is believed to be the most detailed data base of its kind extracted to date from an area of comparable size and antiquity of occupation anywhere in the world. The information processed at this writing conclusively indicates that Meadowcroft Rockshelter and the Cross Creek drainage were initially visited or utilized by at least 14,000 BC and perhaps 17,000 BC. Human occupation throughout the drainage persists into the Historic period. The archaeological sequence at the rockshelter and in the drainage are summarized within the geological, geomorphological, floral and faunal framework in which it occurred, and the results of the project are assessed in terms of the prehistory of southwestern Pennsylvania and in progressively broader perspectives, the Upper Ohio Valley, northeastern and eastern North America and ultimately the New World. (45)

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

Adovasio, J. M. (see Stuckenrath, R.) (45)

Aigner, Jean S. (University of Alaska-Fairbanks) LAND USE ACTIVITIES IN THE MOSQUITO LAKE/ATIGUN AREA OF NORTHERN ALASKA. A review of archaeological sites in the Mosquito Lake/Atigun River archaeological district of northern Alaska indicates repeated use over time by prehistoric and historic native peoples. Several different aspects of the subsistence and land-use systems of these groups may be suggested from the locational data, features and artifactual remains. The northwestern part of Alaska is relatively resource-poor today. Are periods of increased human activity related to environmental cycles which may have affected resource availability here (or in adjacent areas) and made the Mosquito Lake/Atigun River region more attractive? (28)

Akins, Nancy J. (National Park Service) FAUNAL EXPLOITATION IN CHACO CANYON, NEW MEXICO. Six years of identification and analysis of over 50,000 elements from recent National Park Service excavations in Chaco Canyon, New Mexico, has enabled us to address faunal exploitation patterns in both town and village sites over the history of Anasazi occupation. Special attention was paid to determining the seasonality of both individual deposits and the sites themselves. A methodology was employed which has led to the conclusion that large quantities of dried meat may have been returned to the sites without leaving physical remains. This, in conjunction with changes in the utilization of small mammals, presents a more complete picture of subsistence within Chaco Canyon. (25)

Aldenderfer, Mark S. (SUNY-Buffalo) REGIONAL RESEARCH INSTITUTIONS AND THE SMALL-SCALE SURVEY. What happens to the results of the small-scale survey? The most likely outcomes of these surveys seem to be neglect and burial in files. Actual use, especially in the context of the magical regional research designs, appears to be infrequent at best and downright impossible at worst. If this is true, tremendous amounts of data are being wasted. One possible solution to the problem is the enhancement of the role of the regional research institution as a repository of the results of small-scale surveys and the research designs which can integrate them into a useful data corpus. This solution, despite inevitable problems and failures in the past, may become more attractive as cutbacks to Federal and state preservation programs become more severe. Suggestions for both academicians and contract people are offered to help implement the solution. (40)

Alter, Laura and Robert K. Vierra (Northwestern) VARIABILITY, PERIODICITY AND DECISION-MAKING IN DRY-LAND FARMING. The drought theory, invoked as an explanation for Anasazi abandonment, has dominated southwestern archaeology for the last several decades. Data from a recent study conducted on Squaw Point, a dry-land mesa community in southwestern Colorado, challenges this position from two directions: (1) its dependence on summer drought as the single limiting factor; and (2) its incognizance of decision-making processes for coping with microenvironmental variability. Squaw Point data demonstrate that successful crop management obtains in spite of drought stress and a short growing season because agricultural decisions are informed by ecological and cognitive variables. (25)

Altschul, Jeffrey H. (New World Research) BUG HILL: EXCAVATION OF A MULTI-COMPONENT MIDDEN MOUND, CLAYTON LAKE, OKLAHOMA. The excavations at the Bug Hill site represent the final stage of archaeological investigation of the Clayton Lake area prior to impoundment. Under a contract with the Corps of Engineers, Tulsa District, New World Research conducted the excavation during the fall of 1981. Preliminary results are presented, focusing especially on differences found between identified living surfaces representing occupations from the Late Archaic through Late Choctaw. Interpretations are offered on changes over time in subsistence focus and lithic technologies as well as differential use of space. (29)

Anderson, Dana B. (New Mexico) and Robert Vierra (Northwestern) RELATIONSHIPS BETWEEN SITE STRUCTURE AND LABOR AND SOCIAL ORGANIZATION. The purpose of this paper is to construct a methodology through which anthropologists can measure organizational properties of societies in the archaeological record. Both authors have independently carried out research relating to the determinants of social organization. In the course of that research, correlations between aspects of social and labor organization and site structure were recognized. For example, ethnographic observations show a strong correlation between patrilineal and dispersed settlement systems. Cause and effect relationships that are responsible for such correlations are delineated. These determinations are made through the use of the comparative ethnographic record and specific case studies. (4)

Anderson, Duane C. (Iowa) MODELS OF FREMONT CULTURE HISTORY: AN EVALUATION. The Fremont culture was first identified by Noel Morss in 1931. Since that time the complex has been

redefined on several occasions and a number of different models of Fremont culture history have been proposed. This paper examines the literature and discusses pre-1970 points of view regarding the origin, development and disappearance of the Fremont culture. It then considers more recent research noting conceptual problems that have resulted due to a shift in emphasis from culture history to culture process. The paper concludes by presenting a composite model of Fremont culture history intended to facilitate deductively oriented research. (56)

Andrews, R. L. (Pittsburgh) PERISHABLE ARTIFACTS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Four classes of perishable artifacts were recovered from Meadowcroft Rockshelter (36WH297). These include basketry and cordage as well as implements of bone and wood. Though relatively scarce, "perishables" occur in all occupational strata at the site, notably including Stratum IIa. The analytical methods and resultant typology for each of these artifact classes is detailed, and summary comments are offered on the function or functions of each of these classes of items. Comparisons of each perishable class to similar materials from elsewhere is also offered. (45)

Anzalone, Ronald D. (Advisory Council on Historic Preservation) SPACE: THE FINAL FRONTIER? The idea that there is a relationship, albeit a complex one, between a society's social and economic system and the conscious decisions that are made in constructing buildings, laying out settlements, and "organizing" the surrounding environment provides the basis for a possible National Archaeological Research Topic. How and why do settlements change? How can we explain such phenomena as territoriality, crowding, privacy, the connection between social interaction and accessibility, the differing perceptions of space? Archaeologists can contribute their own perspectives on change through time, preindustrial societies and cross-cultural comparison in helping to explain the development of complex human spatial organization. (33)

Applegarth, J. D. (Illinois State Museum) and V. Cowin (Carnegie Museum) EXCAVATIONS AT CROSS CREEK VILLAGE (36WH293) AND THE AVELLA MOUND (36WH415), WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Cross Creek Village (36WH293) is a stratified, multicomponent open site located on the narrow flood plain of Cross Creek, Washington County, southwestern Pennsylvania. The site appears to be a seasonal habitation and lithic tool manufacturing locus, primarily utilizing local Monongahela chert. Late Archaic, Transitional and Woodland cultural components have been noted, and very extensive technomorphological and statistical analyses of these items have been undertaken. The Avella Mound (36WH415) is a complex stone and earth burial mound dating ca. AD 750. It is located above Cross Creek at the northwest corner of the town of Avella in Washington County, Pennsylvania. Prehistoric burial activities at the site are reconstructed commencing with a burning incident and continuing through the building of a variety of circular burial cists (subsequently covered by an earth mantle) to the subsequent introduction of intrusive burials. Excavated remains of 14 individuals are discussed, and the site is compared to other simple and complex stone and stone and earth burial mounds in the Ohio Valley. (45)

Armstrong, George J. (see Martin, Debra L.) (44)

Artz, Joe Alan (see Reid, Kenneth C.) (23)

Arundale, Wendy H. (Alaska-Fairbanks) RESEARCH ON THE NORTH SLOPE: RECENT DIRECTIONS AND FUTURE NEEDS. Over the past 25 years archaeologists have conducted a good deal of research on Alaska's North Slope. Now is a good time to examine this work, particularly the recent contract and public archaeology, and to look at current trends and future needs. The paper's conclusions are based on an assessment of five areas: (1) the problems recent researchers have addressed, (2) the geographic areas that they have investigated, (3) the kinds of sites that they have examined (age, type), (4) the techniques used (survey, excavation), and (5) the availability of results and the original data for further study. (28)

Asch, David L. and Nancy B. Asch (Center for American Archeology) A CHRONOLOGY FOR THE DEVELOPMENT OF PREHISTORIC HORTICULTURE IN WESTCENTRAL ILLINOIS. Since the development of flotation recovery methods during the early 1960s, carbonized plant remains have been systematically collected and analyzed from many archaeological sites in westcentral Illinois. This paper presents an overview of the development of horticulture gained from this record. It characterizes prehorticultural plant utilization and gives a chronology of some of the significant horticultural developments. These include the appearance of squash by 7000 BP, the domestication of Eastern seed plants no later than 4000 BP, the intensification of seed horticulture during Hopewellian times (2000 BP) and the appearance and intensification of maize horticulture (1500-1000 BP). (1)

Asch, Nancy B. (see Asch, David L.) (1)

Baar, Sam W. (Mesa Museum) **POSTSEDENTARY HOHOKAM ARCHITECTURAL UNITS.** Postsedentary Hohokam architectural units are extremely variable. These units range from above-ground structures to deep pithouses. Early investigators accounted for this variability by invoking various migration models. Recent investigators have proposed various environmental and/or developmental models. Data from two recent excavations and numerous older sites are examined with regard to architectural continuity/discontinuity. Available data suggest most of the architectural units represent a continuation of earlier architectural forms, while some units cannot be explained in terms of architectural development. (15)

Ball, J. W. (San Diego) **THE CHRONOLOGY OF PUBLIC CEREMONIALISM AT EL CENOTE SAGRADO, CHICHÉN ITZÁ: A CERAMIC REASSESSMENT.** Among the most spectacular foci of pre-Cortesian ritual activities in the Maya area was the Sacred Cenote at Chichén Itzá. Made famous in the 16th century writings of deLanda, its reputation as an offering place was tested by E. H. Thompson early in this century. A wealth of materials including abundant jade and gold exoticized rewarded his efforts, but the precise time of their deposition remained elusive. This paper examines ceramic data on this issue, concluding that the major era of ceremonialism predated the traditionally-assigned Late Postclassic. (17)

Banks, Kimball M. (Southern Methodist) **THE ENVIRONMENTAL PARAMETERS GOVERNING THE SPREAD OF CATTLE PASTORALISM IN THE SOUTHERN SAHARA.** Stratigraphic, floral and faunal data indicate that environmental conditions were more severe in the Egyptian Western Desert than in the Central Sahara during the Holocene (ca. 12,000 to 4,000 BP). Domesticated cattle, however, appeared some 2,000 years earlier in the former than the latter. The environmental differences between the two areas suggest that domesticated cattle were adopted in the Egyptian Western Desert as a hedge against periods of environmental stress. Cattle did not appear in the Central Sahara until climatic conditions had deteriorated to the point where the more diversified resource base could no longer be successfully exploited. (18)

Banks, Larry D. (Corps of Engineers) **A HISTORY OF THE DEVELOPMENT OF CULTURAL RESOURCE ACTIVITIES IN THE CORPS OF ENGINEERS.** The U.S. Army Corps of Engineers' involvement in cultural resource activities within the past decade is fairly well known, but the Corps' earlier involvement is poorly known even within the Corps of Engineers. This paper traces the Corps' role in archaeological-historical considerations from the early 19th century to the present. The author attempts to go beyond the activities themselves and address the changing attitudes and the rationale for such changes regarding the usefulness of archaeological data-gathering from Corps of Engineer explorations of the past to present day investigations in connection with civil works. (29)

Barber, Russell and Frank Hull (Harvard) **OPTIMAL FORAGING THEORY AND HOHOKAM SUBSISTENCE.** Hohokam subsistence is viewed by many as a series of responses to increasing crop failure, population pressure and declining available moisture. This model is not supported by recent Salt-Gila Aqueduct research. An economic structure is proposed based on optimal foraging theory emphasizing environmental productivity and stability; specialization and generalization of subsistence will be evaluated within the context of this body of theory. Important parts of the Hohokam economic structure include a mode of production that utilized cultigens which were genetically adapted to the southwestern environment and a technology and social organization adept at adjusting to environmental and social changes in the Gila Basin for more than a millennium and a half. This model suggests abundant rather than diminishing resources. (5)

Barnes, Gina Lee (Cambridge) **PEER POLITY INTERACTION IN THE EAST ASIAN SPHERE.** This paper takes as a baseline the mention in Chinese dynastic chronicles of "many countries" existing in prehistoric Japan; a model is postulated whereby these "countries" are successively grouped into hierarchical polities, creating a series of stages of "peer relations" with increasingly larger and more hierarchical polities as the actors. Relations between these polities are characterized by competition for continental iron and bronze mirror exchanges which reflect political ordering and cosmological integration of the participants. The nature of these relations and the material expressions of them will be examined during the 400-500 years before Japan was unified under a single authority in the 7th century AD. (36)

Barnes, Mark R. (National Park Service, SWRO) **ARCHAEOLOGICAL SITE PRESERVATION THROUGH INTERAGENCY COOPERATION: A MODEL FROM THE SAN JUAN BASIN.** In response to energy development pressures in the San Juan Basin of New Mexico, an Interagency Archeological Committee consisting of federal archaeologists from the Departments of Interior, Agriculture and Defense have developed and implemented a Programmatic Memorandum of Agreement and Historic Preservation Plan for cultural resources with the Advisory Council for Historic Preservation. The Agreement and Plan are designed to accomplish two goals: (1) ensure timely and research-oriented federal compliance, and (2) preservation options for different types of sites on all classes of land based on state of the art research and interpretation objectives. (14)

Bartram, Laurence Jr. (Center for American Archeology) **TITTERINGTON SETTLEMENT PATTERNS IN THE LOWER ILLINOIS VALLEY.** Late Archaic Titterington Phase sites in the lower Illinois Valley region are characterized with regard to a landform classification. Regional survey files provide data on sites with diagnostic Titterington lithic forms. These sites are classified by landform type, which shows significant patterning. These data are unresponsive to Cook's (1976) hypothesis of increasing dependence on upland resources during Titterington times. While biases of survey coverage, geomorphic masking, and landform taxonomy exist, Titterington settlement distribution seems to be controlled by proximity to certain landforms, and perhaps access to lithic raw materials. (39)

Basalik, Kenneth J. (Cultural Heritage Research Services) **URBAN ANTHROPOLOGY IN THE MID-ATLANTIC: PROSPECTS FOR ANTHROPOLOGY?** Three major urban centers in the Mid-Atlantic Region, Philadelphia, Wilmington and Baltimore, are experiencing cultural and commercial revitalization. New construction in each city's core is tearing away traces of earlier episodes of urban development. Numerous investigators, most under contract, have sought to document and explain elements of this vanishing evidence, with varying degrees of success. Yet prospects for understanding cultural processes as they change from the 18th century to the present, remain high. The use of archaeological techniques, and anthropological and sociological concepts in historical perspective, may provide valuable insights for today's urban world. (32)

Bathgate, David L. (see Sheets, Payson D.) (17)

Baugh, Timothy G. (Oklahoma) **DEFINITION AND STRUCTURE OF THE SOUTHERN PLAINS MACROECONOMY.** Protohistoric (AD 1450-1700) interaction between Southwest and Southern Plains societies may be viewed as a single socioeconomic system with distinct yet complementary structures. This system is analyzed from the perspective of a dependency model in which three subsystemic positions are present, including a core, periphery and semiperiphery. After characterizing these positions, archaeological evidence (in the form of trade ceramics and obsidian) from two archaeological sites in southwest Oklahoma, Edwards I (34BK2) and Taylor (34GR8), will be presented to verify the existence of this system. Ethnohistorical and ethnographic data will also be utilized for better understanding the role and adaptive strategies employed by these Southern Plains villagers. (20)

Begg, Gene (see Foster, John W.) (53)

Bender, Barbara (London) **EMERGENT TRIBAL FORMATION IN NORTHEAST NORTH AMERICA.** Both beginning and end of the Middle Woodland Hopewellian developments have tended to be explained by "external" factors—the beginning by environmental change, or population pressure or as a response to these technological and subsistence innovations; the end by population pressure, either sheer numbers or pressure in the face of an inadequate or declining resource base. It may well be that some or all of these factors are important, but if so they should be regarded, not as external pressure on indigenous societies, but as internally derived. The main drive of this paper is to attempt a detailed analysis of Archaic and Middle Woodland developments, with an emphasis on the internal dynamics and internal contradictions (maladaptation) that might help explain the changing social relations, changing demographic structures and changing subsistence strategies. (2)

Berman, Mary Jane (SUNY-Binghamton) **A DISCUSSION OF VESSEL VOLUME VARIABILITY: A COMPARATIVE STUDY FROM WESTCENTRAL NEW MEXICO.** Comparison of whole or partially reconstructed vessels from sites in two different valleys of westcentral New Mexico demonstrates that volumetric differences exist. These can be attributed to differences in storage practices. The effects of population size, site function, curate behavior and fluctuating crop yields on storage are examined and evaluated in light of archaeological and paleoenvironmental factors. The degree to which changes in volume size covary with changes in population or environmental perturbations are measured. The occupational histories of the two valleys are discussed, providing a backdrop in which to compare long-term and short-term trends in vessel size. (38)

Bettinger, Robert L. (UC-Davis) **THREE OCCUPATION SITES IN OWENS VALLEY, EASTERN CALIFORNIA, AND THEIR IMPLICATIONS FOR GREAT BASIN PREHISTORY.** Surface surveys carried out in Owens Valley, eastern California, in 1971 and 1972 led to the development of subsistence-settlement models that were quite unlike those expected from ethnographic accounts and previous interpretations of Great Basin human ecology. Ambiguities in the survey data upon which these models rested were subsequently clarified by the excavation of three large occupation sites: Pinyon House, Two Eagles and Crater Middens. The results of these investigations are discussed in terms of their implications for (1) eastern California prehistory, (2) current models of Great Basin human ecology and (3) predictive models of hunter-gatherer subsistence behavior. (53)

Beynon, Diane E. (Indiana-Purdue, Fort Wayne) and J. Donahue (Pittsburgh) **TEMPERING TYPES AND SOURCES FOR EARLY BRONZE POTTERY AT BAB-EDH-DHRA AND NUMEIRA, JORDAN.** The field of geoarchaeology has grown in its approach and application. Geological analyses of archaeological assemblages provide new parameters within which to interpret prehistoric cultural lifeways. Specifically, petrographic analysis of tempering agents in ceramics from the Bronze age site of Bab-edh-Dhra, Jordan had yielded an objective classification of pottery types which can be utilized in relation to the more classical methods of ceramic typology. Finally, this geoarchaeological analysis has shed new light on manufacturing techniques, trade and the identification of preference of tempering agent for vessel form. (38)

Beynon, D. (Indiana/Fort Wayne) and J. Donahue (Pittsburgh) **THE GEOLOGY AND GEOMORPHOLOGY OF MEADOWCROFT ROCKSHELTER AND THE CROSS CREEK DRAINAGE, WASHINGTON COUNTY, PENNSYLVANIA.** Pleistocene modification of the Prepleistocene Meadowcroft Rockshelter (36WH297) by Cross Creek drainage resulted in the development of Meadowcroft Rockshelter to present has been dominated by attrition, rock fall and sheetwash from upland sources. Changes in relative importance of these sources was (and is) controlled primarily by rockshelter configuration and is well documented by textual changes in the sediments and by paleotopographic changes seen at the top of each major stratum. (45)

Biddick, Kathleen (Inst. Research in History) **FROM COMPLEX CHIEFDOMS TO FEUDAL SOCIETIES: TOWARDS DEVELOPING MODELS FOR SOCIAL CHANGE IN NORTHWESTERN EUROPE (300 BC-AD 800).** Over the last decade, archaeologists have strived for coherence in describing the complex social systems in core areas of northwestern Europe in the first millennium BC. Unfortunately, the complex pre-feudal societies of the first millennium AD are still largely perceived as terminologies of a traditional historiography: (1) ethnicity (Germans), (2) ideology (barbarians) and (3) 19th century ethnographic constructs (tribes). A growing body of archaeological data and archaeological reading of contemporary texts encourage alternative characterizations. A model of complex chiefdoms evolving into simple state systems will be outlined for these societies and illustrated by examples of the Merovingians, Mericians and Danes. (9)

Binford, Lewis R. (see Wandsnider, LuAnn) (4)

Birkedal, Terje G. (National Park Service) **BASKETMAKER III RESIDENCE UNITS.** Taking primary guidance from Harner's theory of social evolution, the proposition is explored that the Basketmaker III Anasazi retained an archaic form of residential grouping—namely the minimal subsistence band. Because the settlement provides a spatial master plan of residential social organization, the individual Basketmaker dwellings and their arrangement in the larger community offer the best source of information for examining the validity of the above proposition. Analysis of the data from Mesa Verde shows that Basketmaker III settlements were characterized by a high degree of intra-settlement variation in household architecture and extremely irregular community layouts. It is argued that these findings strongly support the contention that Basketmaker III settlements were typically occupied by a "settled down" version of the minimal band. (4)

Bishop, Ronald L. (see Rands, Robert L.) (51)

Blakey, Michael L. (Massachusetts-Amherst) **A MACROSCOPIC VIEW OF ARCHAEOLOGICAL BEHAVIOR.** This paper concerns several macroscopic social processes influencing patterns of archaeological research. Survey data show ethnically, economically and politically related trends. The Judeo-Christian "roots" of Euro-American and Western European archaeologists dominate research interests when special proximity is controlled; unlike Eastern Europeans who, although more proximate to the Middle East, claim different, materialistic origins for their national and cultural development. A generational analysis of archaeologists shows that they are "coming home" regionally. This trend relates to international political and economic change. Domestic (American) political and economic change appears to encourage a temporal susceptibility of that branch of archaeology to manipulation in political, economic and ideological interests of private and government funding agencies. (31)

Boone, James L. (SUNY-Binghamton) **DEFINING AND MEASURING REFUSE CATCHMENT.** The area which encompasses all the refuse producing activities that contribute artifacts to a single dump may be defined as the "catchment" of that dump. A quantitative approach is explored which relates a measure of homogeneity of refuse contents to refuse catchment size in order to determine approximate relative catchment area of various refuse deposits within a site. (8)

Boone, James L. (see Myers, J. Emlen) (9)

Bowen, Jonathan E. (Ohio Historical Society) **AN INTRODUCTION TO THE SANDUSKY BAY ARCHAEOLOGICAL PROJECT IN NORTHERN OHIO.** The post-AD 500 culture history of the Sandusky Bay drainage is now relatively well understood, but it presents a complex processual problem. Prior to AD 1300 the region was inhabited by two Late Woodland groups, one adapted to the uplands, the other to the lower riverine area. After that date, research shows that both groups abandoned the region, which was later reoccupied by at least one village group budding off from a population to the east. The settlement-subsistence systems of all three groups are being investigated in a long-term project, and their basic outlines are now known. (55)

Bower, John R. F. (Iowa State) **ORIGINS OF DIVERSITY IN EAST AFRICAN PASTORALISM.** One of the most striking contrasts between East African pastoralists and those of other regions is the relative heterogeneity of the former. Archaeological data suggest that diversity has been a more or less persistent feature of East African pastoralism for at least 3,000 years. Although the varied environments of the region have influenced diversity in livestock management, settlement practices, etc., other factors have also been important. In particular, East Africa's role as a refugium for ecologically stressed cultures from the grazing lands on the southern fringes of the Sahara may have contributed strongly to the development of pastoral heterogeneity. (18)

Bowers, Peter M. (BLM-NPR-A Project, Fairbanks) **A PROCESSUAL VIEW OF THE ELUSIVE CULTURE HISTORY OF THE ALASKAN ARCTIC FOOTHILLS: COMPLEXITIES, PROBLEMS, SOLUTIONS.** Recent data from BLM and USGS research in the National Petroleum Reserve (Alaska) have tended to raise more questions than they have resolved persistent problems relating to the refinement of a North Slope culture history. Excavated assemblages often resist unambiguous ascription within established sequences. It is argued that the relative abundance of two resources, chert and caribou, have tended to homogenize the Holocene archaeological record in the area. Complexities of interpretation of North Slope prehistory are discussed in terms of spatial contexts, site definition, dating, seasonality, raw material availability, mechanics of tool manufacture and use, taxonomy and the nature of coastal-interior subsistence and cultural developments. (28)

Boydston, Roger A. (Northwestern) **THE USE OF COST-BENEFIT ANALYSIS IN PREHISTORY: A CONSIDERATION OF TECHNOLOGICAL DEVELOPMENT AND CHANGE.** Using an optimization perspective, a cost-benefit model is developed for the analysis of human resource utilization and, more specifically, technological development and change. Output of the model can be compared to test data, with any deviations examined in terms of the potential influences of other human behaviors, including those related to social organization, residence patterns, scheduling constraints, demography and response to environmental uncertainty. The model is applied to the development and persistence of two alternative stone axe technologies (chipped, ground) during the midwestern North American Archaic. (13)

Bradley, Ronna J. (UT-El Paso) **RESOURCE UTILIZATION AT LA CABRAÑA: AN EL PASO PHASE PUEBLO IN SOUTHCENTRAL NEW MEXICO.** During 1981 an El Paso phase pueblo on the bank of the Rio Grande near El Paso was excavated. A variety of cultural and environmental data were recovered. A major focus of the research is the analysis of resource procurement. This may be derived from analysis of: (1) abiotic resources locally available, (2) biotic resources locally available and (3) resources obtained from outside the immediate area of the site. Analysis indicates that most of the artifact materials were obtained from an area within a radius of several miles from the site. The riverine environment in which the site is located appears to have been extensively exploited for the production and capture of food as well as for construction of utilitarian artifacts. (56)

Bradley, Ronna J. (see Foster, Michael S.) (49)

Brandt, Steven A. (Georgia) **THE PREHISTORY OF SOMALIA: NEW ARCHAEOLOGICAL RESEARCH.** Recent prehistoric archaeological explorations in Somalia, the first in almost 25 years, have resulted in the discovery of sites ranging from Acheulian to Later Stone Age. Of particular interest are the Plio-Pleistocene deposits of northwestern Somalia and the numerous caves and rockshelters in the northeast and southwest. Also of interest are the southern Somali horticulturalists who hunt with bows and arrows and who promise to provide ethnoarchaeologists with valuable new data on the role of hunting in a subsistence farming community. Adjacent to the paleoanthropologically rich areas of Kenya and Ethiopia, Somalia has the potential for making major contributions to the knowledge of human biocultural evolution in Africa. (18)

Brandt, Steven A. (see Elliot, Dan) (53)

Braun, David P. (S. Illinois-Carbondale) **MIDWESTERN MIDDLE WOODLAND EXCHANGE AND SUPRALOCAL INTERACTION.** This paper examines several propositions concerning the

Hopewell phase of exchange in the midwestern U.S.; specifically, concerning the development of a unified system of transactions, the reasons for stylistic standardization or imitation among certain exchanged goods and the reasons for the system's "collapse." The debate over these issues is reviewed, and measurements of differences in decorative standardization among exchange vs. domestic pottery in western Illinois are used to evaluate certain contrasting interpretations. The major changes in the organization of exchange are reconsidered as parts of a single social-evolutionary process. (36)

Brewster-Wray, Christine (Binghamton) FORM AND FUNCTION IN HUARI ARCHITECTURE. The site of Huari, in the central highlands of Peru, is generally understood to have been an urban center and the capital of a state which existed from 550 to 800 AD. As such, it can offer important contributions to our understanding of early urbanism and states. In 1979 a sample of 21 rooms was excavated in the Middle Horizon 1B architectural unit of Moraduchayuc at Huari. The architecture of the unit is similar to the planned architectural complexes associated with the expansion of the Huari state. The evidence for administrative, ceremonial and residential activities in the unit is examined. (46)

Bronitsky, Gordon (Virginia Commonwealth) PRAISE THE LORD AND COMPARE THE DATA, PHASE II. Religion in a complex society is a heterogeneous institution. All too often, archaeologists have assumed fairly simple reflexive links between religious behavior and its material culture correlates. A four-year study of Baptist churches in West Texas was undertaken to examine the relationships among ethnicity, socioeconomic class, behavior and material culture. In this study, material culture was shown to be an effective index of class; ethnicity was more clearly linked to other variables. In order to further examine these links, questionnaires were distributed to congregations. Perception of the built environment is analyzed in terms of ethnic groupings and the relevance for archaeological studies of ethnicity and material culture is presented. (26)

Brose, David S. (Cleveland Museum of Natural History) ARCHAEOLOGICAL INVESTIGATIONS IN CUYAHOGA VALLEY NRA. Archaeological investigations were undertaken in Cuyahoga Valley NRA for the development of a probabilistic site model. Investigations of previously known sites, of several different periods and their ecological associations were used to generate ecologically stratified samples. Sample results formed the basis for a discriminant function analysis. The weighted values for high site probability were mapped by the ODNR-OCAP on an ecological map of the study area. Field verification suggests the value of this technique, and some of its potential dangers. (16)

Brown, Gary M. (Arizona State) LITHIC EXCHANGE AND PRODUCTION ON ANDERSON MESA, NORTH CENTRAL ARIZONA. Interassemblage variation in lithic raw materials is examined in conjunction with comparative analyses of flaked stone assemblages to test a model of specialized exchange and production between AD 1100 and 1500 in north central Arizona. Regression analysis of obsidian distance-decay rates indicates centralization of procurement at three strategic locations during the 12th century. Productive specialization is suggested by differential evidence for bifacial reduction, a pattern intensified during the 13th and 14th centuries. The role of regionally organized production and exchange is discussed in the context of population aggregation, nucleation and collapse of the large towns that characterize this period of Southwestern prehistory. (20)

Brown, James A. (Northwestern) MOUND CITY AND THE VACANT CEREMONIAL CENTER. Investigations conducted over the past 19 years at Mound City provide the single largest combined exposure of a Classic Ohio Hopewell earthwork. The information from this work allows an evaluation of the vacant ceremonial center concept and the notion that a complex social organization was necessary to plan, build and maintain these earthworks. Composed of a sequence of building over a period from AD 1 to 200, Mound City assumed its "planned" shape at the end. The model that emerges from the combined evidence of structures, features, artifacts and food remains is that the center was built by a simple society. (16)

Brown, Kenneth L. (Houston) THE DEVELOPMENT OF THE QUICHÉ MAYA: ARE THE ETHNOHISTORIC SOURCES REALLY A BIBLE? Mesoamericanists have argued that the Quiché Maya "state" of the late Postclassic was the result of foreign intrusion. The main argument has centered on the identity of the foreigners: Toltec or "Toltecized-Maya" from the Gulf Coast. This argument has been based primarily upon the documentary sources. The archaeological support generated is of a superficial nature and has related primarily to the late Postclassic, not its inception—the time of this foreign intrusion. Here, the documents are reexamined in light of recent archaeological investigations designed to test this traditional, document-based reconstruction. An alternative developmental process is presented. (51)

Brown, Margaret Kimball (Dept. of Conservation) MOTHBALLING ALBANY MOUNDS. The acquisition of an archaeological site for preservation purposes is the beginning of a process, not the

end; however, active programs to manage and preserve archaeological resources are not common. One case study offered in this symposium is the recently developed management plan for Albany Mounds, a Middle Woodland mound and village site in northern Illinois. This plan was developed with the assistance of Forestry, Wildlife Resources and Natural Areas personnel and was designed to preserve the archaeological data and to recreate the natural environment for future interpretive purposes. (14)

Bryan, Alan (Alberta) THE TIMLIN SITE. The controversial Timlin site, near Cobleskill, east central New York, was reexcavated in 1979 and 1980 by Hartwick College and University of Alberta teams. A geomorphological study was also made. Definite man-made flakes and artifacts, all of locally available chert and siliceous siltstone, were recovered from postglacial fluvial gravels in the highest terrace of West Creek. Several radiocarbon dates were obtained from the same strata as the artifacts. Problems in the interpretation of the typology, geomorphology, stratigraphy and radiocarbon dating will be discussed. (19)

Bulkstra, Jane E. (Northwestern) and Della C. Cook (Indiana) BIOCULTURAL CHANGE AND CONTINUITY IN WESTCENTRAL ILLINOIS: AN OVERVIEW. In westcentral Illinois, the archaeological record includes numerous prehistoric cemeteries which chronicle Archaic, Woodland and Mississippian biological and cultural adaptation. During the past fifteen years, a problem-oriented bioarchaeological research program has emphasized the study of diachronic change and synchronic variation in the social dimensions of mortuary behavior, demography, biological (genetic) distance, diet and disease patterns. After a brief consideration of method and theory in mortuary site archaeology, this paper will integrate data currently available for these variables and thus establish a model of changing human adaptation in the region. (1)

Burton, Robert J. (Corps of Engineers) THE LEWISVILLE SITE AND AGENCY ARCHAEOLOGY. Drought recently exposed the Lewisville site after 21 years under the waters of a Corps of Engineers lake. An examination of the events surrounding its emergence and the subsequent investigations reveals some of the factors involved in agency archaeology. Expressions of widespread interest by archaeologists and the newsworthy nature of the site were instrumental in obtaining testing funds, but interest lessened when the very old dates reported for the site were found to be in error. The structure of the agency does not facilitate dealing with special archaeological problems of this kind. (29)

Butler, Brian M. and Neal H. Lopinot (Southern Illinois) DEBITAGE VARIATION IN ARCHAIC PERIOD SITES IN THE LOWER OHIO VALLEY. Debitage analysis has too often been neglected as an onerous and largely unproductive task, when, in fact, a systematic approach to these materials often provides valuable complimentary data to the analysis of tool assemblages and on-site activities. A simple classificatory scheme is applied to debitage from a diverse set of Archaic sites in southern Illinois and western Kentucky. A comparison of these data sets reveals a range of debitage characteristics which vary with the intensity and scope of on-site activities. The concepts of "long and short trajectory" sites are examined and found useful, with some elaboration. The potential effects of chert type and distance from source area are also discussed. (49)

Camilli, Eileen (New Mexico) THE FUNCTIONAL ROLE OF LITHIC ASSEMBLAGES AND EFFICIENCY STRATEGIES. Explanation of patterns of tool manufacture are based on an identification of organizational differences in subsistence-settlement strategies which characterize different functional roles for archaeological lithic assemblages. Methods for the identification of efficiency-related and other patterns of stone tool procurement, manufacture and use resulting from functionally different behaviors are addressed with a number of expectations regarding the relationship between lithic tool and debitage types. Collections from Basketmaker II site locations on Cedar Mesa in southeastern Utah are used to illustrate efficiency-related tool use and manufacturing strategies and are compared with later period assemblages. (13)

Cantwell, A. M. (Rutgers) PANPIPES IN EASTERN NORTH AMERICA. This paper will analyze copper, silver and meteoritic iron panpipe covers found in sites of a number of contemporary Middle Woodland cultural traditions in eastern North America. These artifacts, frequently seen as diagnostic of the Hopewell Interaction Sphere (ca. 200 BC-AD 400), are found almost exclusively in ritual contexts (accompanying burials usually of adult males, on altars or in other areas of the burial mound or cemetery). This report will discuss the identification, context, spatial distribution and raw material analyses of these panpipes. The implications of this analysis for understanding the Hopewell Interaction Sphere will be discussed. (55)

Carbone, Victor A. (see Keel, Bennie C.) (33)

Carlisle, R. C. (Pittsburgh), J. M. Adovasio (Pittsburgh), J. Donahue (Pittsburgh), P. Weigman (Western Pennsylvania Conservancy) and J. Guilday (Carnegie Museum). AN INTRODUCTION TO THE MEADOWCROFT/CROSS CREEK ARCHAEOLOGICAL PROJECT: 1973-1982. Meadowcroft

Rockshelter (36WH297) is a stratified, multicomponent site located on the north bank of Cross Creek, a minor tributary of the Ohio River in Washington County, southwestern Pennsylvania. From 1973 through 1978 very extensive survey, testing and full-scale excavations were conducted within this watershed. The focal point of this work was the excavation and analyses at Meadowcroft Rockshelter. The overall goal of this multidisciplinary research project was the elucidation of the geology, geomorphology, floral, faunal, climatological, archaeological and historical record of this watershed in as great detail as possible. The modern setting of the drainage and Meadowcroft Rockshelter are detailed in this paper as is the history of the project specifically in terms of research strategies, data recovery tactics and analytical methods. (45)

Carlson, David L. (Texas A&M) EXCAVATIONS AT JUDY'S CANAL, A MISSISSIPPIAN SITE IN THE AMERICAN BOTTOM. Excavations at the Judy's Canal North site, a small Stirling-Moorehead phase occupation located six miles from Cahokia Mounds, provides insight into the organization of smaller communities during the Middle Mississippian. Analysis of the pit features and structures demonstrates some continuity between Mississippian and Late Woodland adaptations and the ways in which small communities were integrated into the larger Mississippian settlement system in the American Bottom. The results of the excavations are described and their implications for understanding the organization of space and the role of trade networks in small communities is discussed. (39)

Carmichael, David L. (Illinois) FRESNEL SHELTER, NEW MEXICO: PRELIMINARY DATING AND EVIDENCE FOR EARLY CULTIGENS. Initial small scale analysis of materials excavated from Fresnel Shelter, New Mexico, is underway. The site will provide much needed temporal control for Archaic materials in the region. Of particular interest is the presence of corn and beans in early levels of the occupation. The data on early cultigens will be of interest to researchers concerned with the spread of agriculture in the Southwest. In addition, the deposits as a whole provide considerable data for reconstructing the overall Archaic subsistence strategy of the area. (25)

Carnahan, John W. (Barrow, Alaska) HISTORIC AND CULTURAL RESEARCH BY THE NORTH SLOPE BOROUGH. The North Slope Borough, through Elders Conferences, the Traditional Land Use Inventory and by sponsoring research and publication by professional ethnographers, historians and archeologists, advanced its own goals in the documentation of historic and cultural resources. The research results have been used extensively in the planning process for the eight individual Inupiaq villages and for the Borough as whole. Academic research, whether sponsored by the Borough or another entity, will continue to aid the Borough in planning the future for the Inupiaq people. (28)

Carr, Christopher (Arkansas) DISSECTING INTRA-SITE ARTIFACT DISTRIBUTIONS AS PALIMPSESTS. Trend surface analysis, spatial filtering or Fourier analysis and spectral analysis, can be used to partition the variability of some single, continuous, site-wide variable reflecting intra-site artifact arrangement into multiple components representing different archaeological formation processes that occurred in them. Different standard techniques of spatial analysis can then be used within separate homogeneous strata, depending upon the characteristics of the strata and the assumptions required by the techniques, to define tool kits and activity areas with logical consistency between data and technique. (37)

Champion, Sara (see Champion, Timothy) (36)

Champion, Timothy and Sara Champion (Southampton) PEER POLITY INTERACTION IN THE EUROPEAN IRON AGE. Interaction between communities at the same stage of social development is considered with reference to two periods of the Iron Age in Europe; the earlier saw the emergence of more salient ranking, the latter the development of early states. Both phases are characterized by the widespread and simultaneous appearance of certain features, especially of art, prestige symbolism and ritual. It is suggested that these observations are best explained as the result of emulation among competing societies, and that some innovations, such as coinage, had profound effects on sociopolitical organization. (36)

Chang, Claudia (Sweet Briar) THE CONTRIBUTION OF ETHNOARCHAEOLOGICAL RESEARCH TO CHANGING PATTERNS OF LAND USE IN A GREEK VILLAGE. The value of ethnoarchaeological research on village pastoralists' sites for developing models of economic and social change in a traditional Greek village is explored. The assumptions of this approach are that several sets of ethnoarchaeological data contribute to pastoral adaptation: (1) the specialized activity site as an artifact of past economic and social behaviors, (2) site locations as markers of informal rights and access to pasture areas and (3) the history of site use as a document of changing pastoral strategies over several generations. (12)

Chappell, Sylvia (Michigan) STONE AXE SIZES AND EXCHANGE PROCESSES IN NEOLITHIC BRITAIN. The use of stone axe sizes to elucidate exchange processes in Neolithic Britain is discussed. Attention is paid to the creation of the archaeological record and the resulting structure of the axe size data. This allows separation of smaller, discarded axes from larger, lost axes.

Sizes of larger axes from known sources are used in a model of axe size decrease with increasing exchange distance from the source, which further incorporates direction and allows identification of trajectories of preferential axe exchange. Finally axe size data are used to test the hypothesis of coastal movement of another group of axes. (20)

Charles, Douglas K. (Northwestern) SUBSISTENCE-SETTLEMENT IN WESTCENTRAL ILLINOIS: CONTRIBUTIONS FROM THE ARCHAEOLOGY OF MORTUARY SITES. This study attempts to expand our understanding of Archaic and Woodland subsistence-settlement patterns through a regional analysis of mortuary sites relating the spatial structure of the mortuary domain to corporate organization. Data are drawn from published reports and unpublished material from cemetery excavations and burial mound surveys. Evident patterns include regional variation in resource competition during the Archaic, depopulation of the lower Illinois valley during Early Woodland, the relationship of Middle Woodland status differentiation to repopulation and a shift towards extended family economic organization during Late Woodland, culminating with Mississippian maize agriculture. Diachronic analysis of prehistoric ritual systems is emphasized. (1)

Chase, Diane Z. (Pennsylvania) GANN'ED BUT NOT FORGOTTEN: SANTA RITA, BELIZE. The investigations of the Corozal Postclassic Project focused on the site of Santa Rita during 1979 and 1980. Although work actively sought Postclassic Period deposits, earlier materials were also uncovered in the course of excavation. An Early Preclassic presence was discovered in the southwestern portion of Santa Rita. The entire site manifests an Early Classic florescence not common at other northern Belize sites. Analysis of the Postclassic remains recovered from Santa Rita has led to new interpretations concerning the ethnohistoric and archaeological models generally put forth for Postclassic settlement, trade and social organization. (3)

Chernoff, Miriam (Brandeis) EMPIRICAL BAYES ESTIMATION OF CERAMIC PROPORTIONS AT TEOTIHUACÁN. Archaeologists often confront the problem of estimating true proportions of ceramics on the basis of small samples. Empirical Bayes estimation techniques may help to improve the accuracy of such estimates in cases where many assemblages are being sampled and it can be assumed that the population of assemblage proportions itself follows some known distribution. One model assumes that true proportions are approximately normally distributed. A second model uses a beta distribution. Where many of the individual samples are small, the beta distribution should be more appropriate. Both models are investigated using Teotihuacán Mapping Project data. (37)

Cherry, John F. (Cambridge) PEERS, POLITICS AND PALACES: SOME PROBLEMS IN MINOAN STATE FORMATION. Theories of state formation usually revolve around the themes of conflict or cooperation. The concept of peer polity interaction partially overrides such distinctions by emphasizing that the high levels of interaction which initially serve to generate a shared community of language, religion and culture among autonomous polities also provide the context for competitive processes which can lead to internal growth and differentiation. An examination of data from Minoan Crete in this light shows that the concept focuses usefully on neglected questions of symbolic and material interaction; but operational problems remain, especially concerning units of analysis, rates of change and the demonstration of autonomy. (36)

Childs, S. Terry (Boston) REGIONAL CERAMIC VARIATION FROM CAPE COD, MASS. Preliminary findings involving regional and temporal variation of Early through Late Woodland ceramics excavated within the Cape Cod National Seashore, Massachusetts, will be presented. Ceramic function, local need, frequency of use and the technological precision used in manufacture as they relate to specific types of activity areas within the region and through time are basic questions pursued. Stylistic variation should provide clues concerning regional social organization both synchronically and diachronically. The relatively low number of sherds for analysis requires that all initial findings be treated as working hypotheses. (38)

Chilson, William (Edison Electric Institute) THE UTILITY INDUSTRY. Archaeological investigations undertaken for the utility industry are required to meet specific needs of the industry. This paper will include a discussion of the objectives of the utility industry, the means by which these objectives are accomplished and the role of archaeology in this process. Examples of actual or potential problems resulting from the failure of archaeologists to understand industry needs are used as illustrations. The paper concludes with recommendations to archaeologists on how they can better serve the needs of the utility industry. (41)

Choyke, A. M. (SUNY) THE USE OF BONE, ANTLER AND TOOTH AS MATERIALS FOR TOOLS. Bone, antler and tooth tools from a Bronze age tell in Hungary are used to explore the consumption of animal products, activity function and manufacture in the production of this class of artifacts. An attempt is made to set up a structure within which bone tools may be viewed. The framework includes the raw material used and its relation to the general bone sample, functional groups, factors influencing manufacturing decisions and analogies of this material with other coeval cultures outside the immediate area. (22)

Claassen, Cheryl P. and Elizabeth A. Coughlin (Harvard) SILICIOUS AND MICROFOSSIL RESIDUES ON STONE TOOLS: A NEW METHODOLOGY FOR IDENTIFICATION AND ANALYSIS. We wish to introduce a new complementary methodology of microscopic analysis that provides visual confirmation of the classification of OPAL-A and the detection of both characteristic "swarms" indicative of short-range order and of "continuum" indicative of long range order of the liquid crystal phase of amorphous silica (OPAL-A). It is this latter "continuum" phase that precedes and eventually produces deposition on stone tools. This new microscopy technique requires the use of a specifically developed lens system that includes a Zeiss planachromat 16X objective with transmitted Normarski differential interference contrast. (35)

Clark, D. (see Jurgensen, A.) (24)

Clark, J. Desmond (UC-Berkeley) THE SIGNIFICANCE OF CULTURAL CHANGE IN THE LATER PLEISTOCENE IN NORTH AND SOUTH AFRICA. New evidence for the time and nature of the cultural transition from the Middle Paleolithic/Middle Stone Age to, on the one hand, the Upper Paleolithic/Epi-Paleolithic in North Africa and, on the other, to the Later Stone Age in Sub-Saharan Africa is presented and the economic and social implications of the changes and very varied manifestations are discussed. (6)

Clarkson, Persis B. (Calgary) NEW EVIDENCE OF CHORRERA/ENGORROY SOCIETY AND COMMUNITY. Living floors, activity areas and artifacts elucidate aspects of Chorrera/Engorroy occupations of south coastal Ecuador at the site of Loma Alta. Contextual archaeological evidence reveals the use of coca and lime during this time, and the association suggests high status or specialist connotations to the use of coca. (30)

Coggins, Clemency C. (Harvard) WOODEN OBJECTS FROM THE CENOTE OF SACRIFICE. Approximately 100 wooden objects were dredged from the Cenote; these are unusual because so little ancient wood has been preserved in Mesoamerica. They include 30 ceremonial batons: manikin scepters, scythes (?), a nonfunctional Mexican *Macuahuitl*. Throwing sticks and "sacrificial knives" with wooden handles were also found. Another category of objects is "idols"; these are crudely carved wooden forms that were once covered with decorative materials. The various woods and associated adhesives are identified, and through wear analysis an attempt is made to understand the ritual activity which culminated in breaking and burning most of the objects thrown into the Cenote, and the time frame in which it occurred. (17)

Cohen, Barbara E. (Southern Illinois) STYLE AND MESSAGE CONTENT AS MANIFESTED IN ARCHITECTURAL VARIABILITY. The author presents an explanatory model for stylistic behavior, particularly architectural behavior, derived from communication theory and semiotics. Stylistic attributes are defined as behavioral patterns or modes, which take their meaning from their utilization within the cultural system. The cultural system has a "structure" which is roughly analogous to a grammar in verbal communication systems. While messages are continuously emitted in visual signals, actual transmission-events occur only when received by a target individual or group. Therefore, communication-events are marked by behavioral responses in the target group which are potentially observable and interpretable archaeologically. (4)

Cole, John R. (Northern Iowa) and M. T. Mulholland (Massachusetts-Amherst) CLIMATE AND CULTURE IN WESTERN MASSACHUSETTS. Historic and prehistoric water availability and use were examined. "Common knowledge" among regional archaeologists about water and land use history was compared with 1836-1980 climate records; tree rings, ethnohistoric accounts of water crises, flood records and demographic data were compared, testing the hypothesis that they would correlate with each other. Instead, maximum precipitation and minimal flooding correlate with maximum land abandonment in the 19th century and with historic accounts of maximal water crises. There are implications for both policy planning and archaeological method and theory. (23)

Conkey, Margaret W. (SUNY-Binghamton) PALEOLITHIC ART AND INTERPRETING THE PAST. In an attempt to review critically how Paleolithic art has been invoked in support of certain scenarios of the transition to the Upper Paleolithic, the paper will (1) review the scope and forms of Paleolithic art with attention to continuities and disjunctions from previous behavioral evidences, (2) review the evidence that associates the art with the Upper Paleolithic and (3) assess the role of Paleolithic art in light of several different scenarios for the Middle/Upper Paleolithic transition, with particular attention to the changing socioecological contexts that might have led to these particular kinds of artistic activities and products. (6)

Connor, Douglas R. (Southern Methodist) CATTLE PASTORALISM IN THE SAHARA: EVIDENCE FOR A NEOLITHIC COMPLEX IN THE 8TH MILLENNIUM BC. Recent excavation of a Neolithic site in the Egyptian Sahara has produced evidence for pottery production and cattle pastoralism more than 9,000 years ago. Evidence from this site, including a cluster of radiocarbon dates between 9800 and 9000 BP and numerous stratigraphically superimposed hearths, demonstrates long and repeated occupation. The earliest Neolithic in this region was formerly believed to comprise only

small hunters' camps. Evidence now suggests an early emergence of broad-based adaptive strategies including the use of domestic stock and patterned resource exploitation, systems previously thought to have appeared only during the Middle Neolithic 1,000 to 1,500 years later. (18)

Cook, Anita G. (SUNY-Binghamton) THE DISTRIBUTION OF IMPERIAL ICONOGRAPHY IN THE CENTRAL ANDES. Imperial expansion characterized the growth of Huari and Tiwanaku within the Central Andean culture area. This occurred during the early part of the Middle Horizon (ca. 550-700 AD). The nature of interaction between these sites is unclear, but they share a common iconographic pantheon depicted on various media. The spatial distribution of this iconographic repertoire is discussed. Important aspects of design structure are defined as a basis for inter-regional comparisons. This procedure is leading to a better understanding of Huari-Tiwanaku symbolic communication, and its role in political expansion. (46)

Cook, Della C. (see Buikstra, Jane E.) (1)

Cook, Thomas G. (Center for American Archeology) THE LATE ARCHAIC TITTINGTON CULTURE: A DISPERSED HARVESTING ECONOMY. While the Late Archaic is often characterized as a time of narrow spectrum economies based upon deer, mussels and nuts with a settlement pattern involving dense concentrations of populations at seasonally occupied base camps, the Tittington Culture (2250-1900 BC) of western Illinois and Missouri has a very different subsistence-settlement system characterized by small hunting and harvesting camps scattered across the southern forested areas of the Prairie peninsula. The Tittington population is dispersed, occurs as small groups and is highly mobile to pursue game, especially Virginia deer, because the culture is practicing a dispersed harvesting economy, in marked contrast to other Late Archaic cultures in the midwestern United States. (1)

Cossette, Evelynne (see Paradis, Louise I.) (42)

Coughlin, Elizabeth A. (Harvard) ARTIFACTS FROM THE SACRED CENOTE AT CHICHÉN ITZÁ: ANALYSIS, IDENTIFICATION, CHARACTERIZATION, CHRONOLOGY. Artifacts from the sacred cenote at Chichén Itzá consisting primarily of organic vegetal materials such as rubber, copal, wood, textiles, adhesives and pigment/dyes (as well as secondary inorganic inclusions) and ceramics have been analyzed, identified and characterized using a series of analytical techniques, some of which have been developed specifically for this purpose. Neutron activation analysis, thermoluminescence, X-Ray Fluorescence, Energy-Dispersive X-Ray Analysis, Chromatography and Electrochemical Analysis have been used in the analysis of these materials. (17)

Coughlin, Elizabeth A. (see Claassen, Cheryl P.) (35)

Cowin, V. (see Applegarth, J. D.) (45)

Craig, Douglas B. (Arizona) A FALL-OFF MODEL FOR THE UPPER AND MIDDLE SANTA CRUZ EXCHANGE NETWORK IN SHELL. The presence of marine shell in many prehistoric Southwestern sites is generally viewed as indicating an exchange system which dealt in both raw and finished shell items. A fall-off model is applied to the hypothesized exchange network that extended along the upper and middle Santa Cruz River during the Hohokam Preclassic and early Classic. On the basis of the test results and those from a similar study for the Gila-Salt to Flagstaff network, it is suggested that exchange in marine shell may have operated on different organizational levels within the Hohokam culture area. (20)

Cross, Paula (see Kelly, Lucretia S.) (11)

Crown, Patricia, and Allen Dart (Arizona State Museum) VARIABILITY OF HOHOKAM AGRICULTURAL PRACTICES AS OBSERVED FROM STUDIES ALONG THE SALT-GILA AQUEDUCT, CENTRAL ARIZONA PROJECT. In the past century interest in prehistoric Hohokam agricultural activities was concerned primarily with their extensive irrigation works. Recent investigations of Hohokam agricultural practices in southcentral Arizona as part of the Salt-Gila Aqueduct Project reveal that irrigation was only one part of a complex and diverse agricultural system. The research suggests that the Hohokam utilized a variety of techniques in adapting to particular environmental situations throughout the region, with apparently increasing diversity through time. (5)

Crumley, Carol L. (North Carolina) TRANSATLANTIC DIALECTICS: A MULTIDISCIPLINARY APPROACH TO CULTURE CHANGE. Since 1975, our research group has worked to identify factors influencing two thousand years' settlement in southern Burgundy, and to document continuity and change in settlement agglomeration and land use from Iron Age (Celtic) times to the present. The scale of the study is regional, and the approach is multidisciplinary (with emphasis on ecological, economic and historical aspects), and diachronic. The theoretical and

methodological approaches utilized by the research group reflect both European and American thought and scholarship; this paper explores these relationships and argues for their combined utility in the study of culture change. (2)

Curran, Mary Lou (Massachusetts) THE LITHIC RECORD AND INTERNAL SITE STRUCTURING AT THE WHIPPLE SITE. In 1977 the first intact Paleoindian activity area excavated professionally in New England was found at the Whipple Site, in southwestern New Hampshire. Computer mapping programs record microstratigraphic variability of lithic materials within the site. Data analyses aid definition of previously amorphous characteristics of Paleoindian sites, such as duration of occupation, size and organization of occupying group and contemporaneity of specific events. Subsequent distribution frequency analyses permit comparison with prior internal site structuring predictions and behavioral correlates, addressing such issues as implications for social structure, territoriality, resource scheduling and technologic efficiency. (35)

Cushman, K. (Gibbs and Hill) FLORAL REMAINS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Botanical material that includes seeds, fruits, wood, charcoal and pollen has been recovered from Meadowcroft Rockshelter (36WH297). These remains cover a ca. 16,000 year time span. All plant species identified in the fossil record are also present in the area of the site today. The earliest plant material contains *Quercus* sp., *Juglans* sp. and *Carya* sp. elements. Contrary to the assumption that proximity to the Wisconsin glacial ice front would have produced tundra/boreal conditions near Meadowcroft, the botanical information argues for a mixed conifer/hardwood vegetation at the site throughout its period of human occupation. Comments on plant food resources available for human use at and near the site are also discussed as are the corn and cucurbit domesticates from Stratum IV that currently are the oldest known in the Upper Ohio Valley. (45)

Cushman, K. (see Adovasio, J. M.) (19)

Daggett, Richard E. (Massachusetts) THE NATURE OF THE EARLY HORIZON IN THE NEPEÑA VALLEY, NORTH COAST OF PERU. A broader view of the nature and extent of the Early Horizon is provided by a recent surface survey of the Nepeña Valley. The upper limit of prehistoric valley settlement is established and the architectural prototype for the Early Horizon is defined. Site configuration follows a pattern of more to less complex as one proceeds up valley and there is a demonstrable consistency in site assemblages. The ceremonial nature of one middle valley site is discussed. (46)

Damp, Jonathan E. (Lifeways of Canada) STRUCTURE AS HOUSE, HOUSE AS STRUCTURE. EARLY VALDIVIA SOCIAL AND ECONOMIC DESIGN. The architecture of the Valdivia I and II (3300-2300 BC) communities provides evidence on structural designs of early village life. Household clusters from the sites of Real Alto and Loma Alta on the Ecuadorian coastal lowland reveal domestic patterning in activities such as sleeping areas, cooking, tool working, cotton spinning and burial of the dead. The structure of the village layout gives information on social and environmental cognition. The village plan provides an ideological structure of order in the shape of a U. Together, house and village patterns at Real Alto and Loma Alta reflect the beginnings of settled village life in the context of an agricultural economy. (30)

Dart, Allen (see Crown, Patricia) (5)

Davis, E. Mott (Texas-Austin) BETWEEN THE GROUND AND THE LABORATORY: THE COLLECTION AND CURATION OF ARCHAEOLOGICAL SPECIMENS FOR SPECIAL ANALYSIS. The handling of archaeological materials intended for analysis by specialists such as palynologists, pedologists or radiocarbon dating laboratories can present special problems not only of collection but also of curation—that is, of their care in the time that might last anywhere from a few hours to several decades. Appropriate procedures of collection, curation and documentation, outlined in this paper, are often vital to the archaeological interpretation of the results of the laboratory analysis. (54)

Dean, Jeffery (Arizona) DENDROCLIMATIC VARIABILITY AND DEMOGRAPHY, BLACK MESA. A climate sensitive tree-ring chronology based on samples from living trees and archaeological sites near Black Mesa provides a basis for reconstructing relative dendroclimatic variability over the last 1,500 years in the area. Positive and negative tree growth departures reflect similar variation in annual precipitation. Some of these fluctuations coincide with human population variability on northern Black Mesa, especially with the major population increase after AD 900 and with the abandonment of the area around AD 1150. (44)

Dennett, Sarah and Hans Muessig (Dennett, Muessig and Associates) MAPPING ARCHAEOLOGICAL SITES USING GROUND-BASED PHOTOGRAMMETRY. The last two decades have seen a revolution in the techniques used to study man's past. Sadly bypassed by this revolution is the entire area of field methods. Ground-based photogrammetry, extensively used in Europe, offers

significant advantages over traditional mapping procedures. It is an accurate, versatile and rapid technique. Upwards of 1,500 m² per day can be recorded, and contour maps, planimetric maps showing individual artifacts and profiles can be produced. (52)

Denny, Sidney G. and William I. Woods (Southern Illinois-Edwardsville) THE SUMAC SITE: A CRAB ORCHARD HAMLET IN SOUTHERN ILLINOIS. Investigations conducted at the Sumac Site (11-FK-62) during summer 1980 are described. Field activities consisted of controlled surface collection, machine-aided plowzone removal and the excavation of 227 features. Included in the feature total are two basin houses and two single post structures without basins. Analysis of recovered data indicates that the site was a nearly pure Crab Orchard Tradition hamlet with three sequential occupations. The three occupations appear to date ca. AD 200 and are believed to represent a very short period of total site habitation. (39)

Derven, Daphne L. (Corps of Engineers) THE REGULATORY PROGRAMS AND ITS IMPACTS ON CULTURAL RESOURCES. The Corps of Engineers operates a regulatory program which issues Department of the Army permits under Section 404 of the Clean Water Act. Cultural resources are one of the factors considered in the permit review process. The potential variation in types of projects and therefore the individual and cumulative effect on cultural resources must be considered in terms of the project itself, the statutory time limits of the regulatory program and the fact that the impacted areas are primarily waterways and their associated wetlands. The paper presented will utilize the Ft. Worth District as a case study. (29)

Desmond, Lawrence G. (Colorado) THE EXCAVATION OF THE PLATFORM OF VENUS, CHICHÉN ITZÁ, YUCATÁN, 1883: THE FIRST SECTION AND USE OF PHOTOGRAPHY IN AN EXCAVATION IN MESOAMERICA. During November or December 1883, Augustus Le Plongeon and his wife Alice excavated the Platform of Venus at Chichén Itzá, Yucatán, Mexico. His excavation cross-section, plan and photographic record are the first of their kind in Mesoamerican archaeology. This record was a data base from which he would later draw in his efforts to solve the question of Maya origins and history through an analysis of its iconography, art, architecture and artifacts. His conclusions about the Maya were completely rejected and as a result his contributions to archaeological methods went unnoticed. (7)

Dibble, Harold L. (Arizona State Museum) VARIABILITY AND CHANGE IN THE MIDDLE PALEOLITHIC. Many of the problems in explaining the transition from the Middle to Upper Paleolithic can be shown to be the result of current definitions of these periods. In particular, most definitions tend to mask important aspects of the variability which exists within each period. Using data from the Near East and Western Europe, distinct patterns of variability and change in technology are presented for the Middle Paleolithic that may reflect some of the processes relevant to an understanding of that transition. (6)

Dickens, Roy S., Jr. (Georgia State) INFRAPATTERNS AND THE FORMATION OF THE URBAN ARCHAEOLOGICAL RECORD. Material patterns and the cultural processes that contribute to their formation are of current interest in historical archaeology. In urban sites, cultural formation processes are characterized by secondary deposition that is localized, massive, and short-term in nature. These processes often result in artifact assemblages that reflect seasonal and activity-specific behavior. Such infrapatterns must be recognized and properly interpreted if more general patterns of ethnicity, socioeconomic level and status are to be accurately reconstructed. Furthermore, techniques developed for recognizing infrapatterns in the urban setting will make the concept more useful in nonurban situations, where historical documentation may be less complete. (32)

Dillehay, Tom D. (see Netherly, Patricia J.) (46)

Dirst, Victoria (Wisconsin-Oshkosh) THE EUREKA TO OMRO ARCHAEOLOGICAL SURVEY. In the summer of 1981 the University of Wisconsin-Oshkosh conducted an archaeological survey along the Fox River in eastern Wisconsin. This survey revealed important new information regarding prehistoric settlement systems. Though Woodland peoples used the valley for winter base camps, it seems that the Oneota refrained from establishing settlements in that area, using it mainly as part of their hunting territory. The paper explores reasons for this apparent shift in subsistence strategy during the late prehistoric. (39)

Donahue, J. (see Adovasio, J. M.) (19) (45)

Donahue, J. (see Beynon, D.) (45) (38)

Donahue, J. (see Carlisle, R. C.) (45)

Donahue, J. (see Stuckenrath, R.) (45)

Donahue, J. (see Vento, F. J.) (45)

Douthit, M. Lee (BLM) AN ARCHAEOLOGICAL PERSPECTIVE IN THE FIELD TREATMENT OF ARTIFACTS. A great deal of field archaeology has to do with the collection of artifacts, noting and measuring their spatial distributions and contexts. Less concern and time has been spent considering their preservation for immediate or future study, analysis or display. However there are techniques of handling artifacts that ensure their long-term survival in time- and cost-efficient ways of preserving the artifact for analysis. It is more and more essential for field archaeologists to be aware of and practice good field conservation if collections are to be usable now, as well as in the future. (54)

Downing, Theodore E. (see Sutro, Livingston D.) (21)

Doxtater, Dennis (Arizona) SPATIAL ORIENTATION AND SYMBOLISM IN THE ANCIENT FARM CULTURE OF SCANDINAVIA. This report summarizes extensive research undertaken as an interdisciplinary dissertation in architecture and anthropology at the University of Michigan. A hypothetical, "Eliadian" center structure of spatial orientation and symbolism is derived from an analysis of Norse mythology. This master pattern then provides the means for discovering similar patterns of spatial content—oriented by solstice axes—in physical dwellings, farm clusters of buildings, ritual sites, Viking settlements and Christian churches. The graphic and sculptural forms of Viking and Folk artifacts are illustrative of pervasive center symbolism. (9)

Ebert, James I. (National Park Service) REMOTE SENSING AS AN INTEGRATIVE METHODOLOGY FOR ARCHAEOLOGY. Since about 1970, the use of remote sensor data, especially from satellite platforms, has greatly affected geography, geology, and many aspects of other biological and earth sciences. It is suggested that remote sensing may serve as the basis for a similar transformation in the ways archaeologists perceive their data and the objectives of their studies. One archaeological question upon which the remote sensing perspective can be brought to bear is that of the definition of sites. The impacts of remote sensing on alternative definitions of sites are discussed on methodological, theoretical and practical levels. (52)

Edens, Christopher (Harvard) A NOVEL ARCHAEOLOGICAL CONFIGURATION IN THE ARABIAN GULF. As a part of the fifth season of the French Archaeological Mission to Qatar, excavation was conducted on a small island in northeast Qatar. The excavation indicates the presence of an architectural, ceramic and malacological configuration not previously noted in the Gulf. This configuration is provisionally identified as a shellfish dye production site. Should this identification be corroborated by laboratory analysis of sediments and ceramic residues, the existence of such a site in the central Gulf would entail a model of greater economic complexity than now generally admitted. (10)

Ehrman, Virginia L. (Victoria) AN ANALYSIS OF THE EIGHT-DEITIES SECTION IN THE CODEX LAUD. The paper examines one chapter of the Precolumbian religious manuscript Codex Laud (MS. Laud 678, Bodleian Library, Oxford), Fols 16-9, in which one deity appears on each of the eight pages. A comparison of these sheets on the basis of two sets of elements shared by each folio discloses an inherent grouping of depicted objects according to positive and negative principles. An external comparison of the day signs on each Laud page with native interpretations of the calendar, as recorded by Bernardino de Sahagún and Diego Durán, supports the benign/malevolent bifurcation detected in the internal investigation. (42)

Eighmy, Jeffrey L., J. Holly Hathaway (Colorado State) and Allen E. Kane (Dolores Archaeological Program) EXTENSION OF THE SOUTHWEST VIRTUAL GEOMAGNETIC POLE CURVE (AD 700-900) BASED ON DOLORES ARCHAEOLOGICAL PROGRAM RESULTS 1978-1980. Work in the Dolores Archaeological program produced a large number of archaeomagnetic samples expected to date between AD 700 and 900. Of these samples 36 are independently well dated. Twenty-seven are found in direct association with tree-ring dates while nine others were found closely associated with tree-ring dates. On the basis of these samples, an independent reconstruction of the Southwest Virtual Geomagnetic Pole Curve for this period can be initiated. When compared with the early segment of the Southwest curve described by Weaver (1967) and by Wolfman (1979), the data from Dolores suggest a substantial modification of the AD 700-900 segment. (47)

Elera, Carlos, G. (see Shimada, Izumi) (46)

Elliot, Dan (Southeastern Wildlife Services), Steven A. Brandt and Thomas Gresham (Georgia) PALEOINDIAN OCCUPATION OF MIDDLE GEORGIA: THE TAYLOR HILL SITE. The Taylor Hill site, a stratified Paleoindian and Early Archaic site on the Savannah River near Augusta, represents the first well documented intact evidence of early humans in Georgia. Test excavations have provided information concerning Paleoindian and Early Archaic lithic technology, resource exploitation and settlement for an area of the Southeast that has previously been an archaeological void. Examination of the stone tools, debitage and other artifacts suggests a diver-

sity of activities at the site, while the density and distribution of artifacts indicates more than a temporary occupation. (53)

Emerson, Alice M. (Washington State) A PLAINS APPLICATION OF BINFORD'S MODELS OF FAUNAL ASSEMBLAGE COMPOSITION. Binford's graphic technique for describing caribou and sheep assemblages proves helpful in evaluating bison assemblages from the Plains. Assemblage frequencies are plotted against indices of skeletal element value derived from expectations that alter with changes in logistical strategies. Positive, negative and scattered point relationships provide information concerning archaeological assemblage development. Although general curve shape is meaningful, analysis of point relationships provides detailed information about assemblage characteristics. The method is a potentially useful, complementary tool to current methods of analysis. Its value lies in the tighter definition of assemblage characteristics making determinations of site types and activities clearer. (56)

Emerson, Thomas E. and George R. Milner (Illinois) COMMUNITY ORGANIZATION AND SETTLEMENT PATTERNS OF PERIPHERAL MISSISSIPPIAN SITES IN THE AMERICAN BOTTOM. Recent excavations in the American Bottom have revealed large numbers of Mississippian structures and features from "fourth-line" communities. It is now possible to recognize functionally distinct units such as farmsteads, communal structures, and mortuary/charnal houses within these communities. It is contended that such units are part of dispersed villages which represent the basic level of Mississippian social/political/religious integration. The integration of such villages at both the local and regional level is discussed and in addition the influence of local physiography on the settlement pattern is examined. (11)

Epstein, Stephen M. (Pennsylvania) THE INCA COPPER SMELTING INDUSTRY AT CERRO DE LOS CEMENTERIOS, PERU. The site of Cerro de los Cementerios lies on Peru's North Coast, within sight of the modern agricultural cooperative of Batangrande, which has been the focus of Princeton University's Batan Grande-La Leche Archaeological Project since 1978. Two seasons of survey and excavation at the Cerro have revealed an Inca copper smelting installation of industrial proportions. This industry can be characterized as a "prill extraction" technology, involving the grinding of slag on stone *batanes* to recover small droplets of smelted metal suspended in the slag matrix. Although the smelting furnaces used are small, they occur on the site in great numbers, with a considerable combined production potential. (27)

Ericson, Jonathon E. (Harvard) CORRELATION BETWEEN EMPIRICAL AND EXPERIMENTALLY-DERIVED HYDRATION RATES. Generally, source-specific empirical hydration rates are determined by linear or nonlinear regression of hydration measurements and associated radiocarbon dates. Obsidian can also be hydrated under controlled hydrothermal conditions in the laboratory. This technique is quite straightforward. We can greatly advance obsidian hydration dating if we know the degree of correlation between empirical and laboratory hydration rates. The results of seven years of research on this problem are presented. (24)

Evans, Susan T. (Catholic) PROCESSUAL CHANGE IN POLITICAL STRUCTURE IN THE BASIN OF MEXICO, LATE HORIZON. This paper presents an analytical model of processual change in the structure of the political hierarchy of the Basin of Mexico in the Late Horizon (AD 1350-1520). In general, the political events of this period show a trend toward the centralization of power within a mechanically integrated system of segmental city-state units which was expanding in size and complexity. The histories of particular political groups provide the empirical basis for a set of ideal structures which are then interpreted using Flannery's systemic framework of cultural evolution. Emphasis is on the changing role of the Mexica in the general hierarchy of political control in the Basin. (42)

Falconer, Steven E. (Arizona) CERAMIC DEGENERATION AND SOCIOECONOMIC INFERENCE IN SOUTHWESTERN ASIA. Archaeologists attempting to understand social changes in prehistoric southwestern Asia have given special attention to studies of pottery, due to its relative abundance and its potential to indicate temporal and geographical variability. Unfortunately, interpretations of changing ceramic assemblages usually have failed to consider the socioeconomic factors which may also be responsible for ceramic variation. This has been true most notably when trends of change are judged to be "degenerative." A study of ceramic change through the Ubaid period (ca. 5300-3600 BC) of Mesopotamia illustrates how "degeneration" can be correlated with the development of complex societies in the region. (38)

Farnsworth, Kenneth B. (Center for American Archeology) HABITATION SITE EVIDENCE FOR WOODLAND PERIOD REGIONAL SETTLEMENT PATTERNS IN THE LOWER ILLINOIS VALLEY DRAINAGE. In 20 years, archaeologists working in the Lower Illinois Valley drainage have surveyed more than 1,200 prehistoric habitation sites. A central focus of the work has been to document regional Woodland period settlement. This paper discusses changing survey strategies and results, and assesses the utility of extant site-reconnaissance data for reconstructing and studying changes in regional settlement patterns between 800 BC and AD 1100. Finally, a project involving excavations at six Middle Woodland sites will be discussed, evaluating the ex-

tent to which apparent settlement patterning actually reflects conscious structuring of regional subsistence/extractive activities on the part of Illinois Valley Middle Woodland groups. (1)

Farrand, William R. (Michigan) ROCKSHELTER AND CAVE ENVIRONMENTS. Although typical cave dwellings represent only a limited part of the spectrum of prehistoric habitations, these specialized niches nevertheless furnish abundant details on human paleoecology. Rapid sedimentation and protection from subsequent erosion and weathering combine to preserve a more detailed record than is common in open-air sites. Difficulties in interpretation stem from the mixed and immature nature of the sediments, requiring multiple analytical techniques. Differences in geomorphic setting, bedrock type and general climatic regime complicate comparisons of cave sequences from one area to another. In spite of abundant activity, no organized theory yet exists to standardize interpretations. (50)

Farris, Glenn J. (Calif. Dept. Parks and Recreation) KEEPING HISTORY HONEST: HISTORICAL ARCHAEOLOGY AT FORT ROSS. Historical archaeologists rely heavily on the written record. However, archaeologists, in emphasizing the material aspects of history, have different needs than most historians. Evidence derived from excavation projects is sometimes at variance with "history." In the Fort Ross case, valuable inventory documents were found to have been mistranslated. An hypothesis was developed as to the correct translation and archaeological findings have substantiated this hypothesis. The historical archaeologist is wise to review the original accounts rather than to rely on the historian's appraisal. (7)

Feder, Kenneth L. (Central Connecticut State) WHOOPS! THE USE OF MISTAKES IN LITHIC ANALYSIS. Broken or incomplete tools, often ignored in archaeological analysis, are extremely valuable in providing information on the stone tool manufacturing process and phase-use histories of individual tools. Due to raw material intractability, the lithic assemblage of the Alsop Meadow Site in Avon, Connecticut, provides us with an opportunity to examine tools broken or abandoned in every step of the manufacturing process. This paper will present preliminary results of the analysis of the Alsop assemblage. Steps in the tool manufacturing process as inferred from the cross section of broken tools recovered will be suggested. The importance of such broken members of tool assemblages will be expanded upon. (49)

Fish, Suzanne (Arizona State Museum) PALYNOLOGICAL IDENTIFICATION OF PREHISTORIC FIELDS. Hohokam sites of the Salt-Gila area existed within a culturally modified environment. Irrigation not only allowed the survival of cultigens, but supported communities of specialized natural taxa which can be thought of as an additional resource zone. Pollen samples from agricultural proveniences provide a localized record of cultivation practices and an opportunity for comparison with habitation samples. Modern analog studies have added a further dimension to interpretation of these samples. (5)

Fitting, James E. (Professional Services Industries) INDUSTRY AND ARCHAEOLOGY. During the past decade archaeological investigations have become an integral part of many industrial activities. Many archaeologists have worked for industries, often with little realization of the needs and goals of these industries. This has resulted in poor communication as archaeologists make recommendations that are not compatible with the needs and goals of industry. The purpose of this symposium is to allow representatives of the oil and gas, coal, utility and highway construction industry to present their needs and goals, relate some experiences with archaeologists, and to suggest to archaeologists how they might better work together. (41)

Fitzgibbons, P. T. (Pittsburgh) LITHIC ARTIFACTS FROM MEADOWCROFT ROCKSHELTER AND THE CROSS CREEK DRAINAGE, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Six hundred six flaked stone artifacts, ca. 6000+ pieces of lithic debitage and 26 complete and fragmentary ground stone artifacts were excavated at Meadowcroft Rockshelter between 1973 and 1977. Approximately 600 flaked stone artifacts and 100 ground stone artifacts derive from other archaeological sites surveyed in the Cross Creek drainage. Analysis of these lithic materials has employed surface and edge wear examination at both low and high magnification with the objective of developing both technomorphological and functional tool typologies. The Stratum IIa associations of the lithics at Meadowcroft are well dated via radiocarbon, and the artifacts comprise a small but highly important assemblage. These materials are among the earliest securely dated artifacts in the Northeast. They exhibit affinities to a number of other assemblages both in the Cross Creek drainage and elsewhere in North America. Ultimate "affinities" to lithic assemblages of the middle and late Upper Paleolithic of Siberia also may be evident. The full range of analytical techniques employed in the study of the Meadowcroft/Cross Creek lithics is discussed. (45)

Ford, Richard I. (Michigan) THE ARCHAEOLOGICAL CONSERVANCY, INC. The Archaeological Conservancy is a nonprofit organization that facilitates the preservation of significant archaeological sites through purchase and donation. Incorporated in 1979, the Conservancy operates with a permanent office in Santa Fe, New Mexico, and a Board of Directors consisting of professional archaeologists and enlightened citizens. It works closely with State Historic Preser-

vation Officers, universities and practicing archaeologists before sites are acquired. To date 32 sites in 8 states are owned or are under negotiation by the Conservancy. These sites are now protected from destruction and are available for research if a CRM plan for each site is met. (14)

Ford, Richard I. (see Wills, Wirt) (25)

Fortier, Andrew C. (Illinois) ARCHAEOLOGICAL INVESTIGATIONS IN THE HILL LAKE LOCALITY OF THE AMERICAN BOTTOM. Archaeological investigations in the Hill Lake locality of the American Bottom of southwestern Illinois provide a unique opportunity to examine site, subsistence and material culture variation within a discrete physiographic locale involving a prehistoric continuum extending from the Late Archaic (2100 BC) to Early Mississippian (AD 1000) periods. Key data recovered from eight sites are presented and the relationship between the dynamic geomorphic character of this locality and its settlement history is detailed. Particular attention is given to the stratified Mund site which contains buried Early and Middle Woodland materials lying nearly two meters below a major Late Woodland encampment. (11)

Foster, John W., Francis A. Riddell (Calif. State Parks), G. James West (Reclamation), Gene Begg (UC-Davis) and William H. Olsen (BLM) THE WITT SITE: A DATED FLUTED POINT ASSEMBLAGE FROM THE SURFACE SHORELINE OF TULARE LAKE, CALIFORNIA. A controlled surface collection from an ancient shoreline of Tulare Lake has been conducted. The large lithic collection includes Clovis-like and smaller fluted points, atlatl spurs, blades, crescents and assorted knives, drills and scraping and chopping tools. The faunal assemblage includes mammoth, horse, camel, bison and ground sloth. A total of 16 human skull and long bone fragments have also been recovered. One dated specimen (12,234 ± 71 BP by Uranium-Thorium) suggests contemporaneity with Pleistocene fauna and strongly implies that the physical remains of Clovis-age people are now known from California. (53)

Foster, Michael S. and Ronna J. Bradley (UT-El Paso) A FUNCTIONAL ANALYSIS OF AN APACHE UTILIZED GLASS ASSEMBLAGE. What is presumed to be an assemblage of utilized glass fragments from the western foothills of the Sacramento Mountains in southeastern New Mexico is being subjected to a functional analysis. It is believed that the site may represent a Mescalero Apache camp or hunting station. None of the fragments has been retouched into formal tools. The damage on the fragments is quite variable and as a result functional interpretations are difficult. In an effort to understand this variability a series of experiments has been undertaken in an effort to determine the origin of the damage, whether it is fortuitous or the result of use. These experiments include analysis of damage resulting from breakage and use. (49)

Fowler, William R., Jr. (Calgary) THE SOUTHEAST PATIO GROUP AT CIHUATÁN, EL SALVADOR. Excavations in 1978-1979 on the Southeast Patio group of the West Ceremonial Center of Cihuatán led to a substantial increase in knowledge of elite residential architecture at that important central Salvadoran Postclassic center. Three phases of construction, two of which were partly contemporaneous, have been recognized. With the aid of 16th century ethnohistoric evidence, the patio group is tentatively interpreted as residential quarters for religious officials of the town. (51)

Freidel, David A. (SMU) CERROS: PLANS, PLANTS AND POLITICS AT A LATE PRECLASSIC LOWLAND MAYA CENTER. Investigation of the settlement zone at Cerros had demonstrated the presence of a complex system of canals, ditches and fields surrounding the center. Radiocarbon dates and *in situ* whole vessels document this as the earliest known extant complete hydraulic system in the Lowlands. The system is thoroughly integrated into the intra-site plan of public buildings at the site. It is suggested that, like the buildings, the system was a public works program. If this is true, then the upgrading of agriculture may have "trapped" mobile swiddenists into the orbit of Cerros. (3)

Frison, George C. (Wyoming) THE AGATE BASIN SITE. The Agate Basin Site in eastern Wyoming provides stratified evidence of four Paleoindian culture complexes: Clovis, Folsom, Agate Basin and Hell Gap. Winter bison procurement in an arroyo trap was the main economic focus. Taphonomic studies of small noncultural mammals along with studies in geology, soils, and plant communities offer a basis for interpretation of Late Pleistocene/Early Holocene climates and subsequent changes in the topography of the area. (19)

Fryman, R. (Pittsburgh) PREHISTORIC SETTLEMENT PATTERNS IN THE CROSS CREEK DRAINAGE, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. From 1974 to 1977, the Meadowcroft/Cross Creek Archaeological Project conducted an intensive survey of the entire Cross Creek drainage in Washington County, southwestern Pennsylvania. During that reconnaissance, a total of 231 sites was recorded within the Cross Creek watershed. No random or stratified sampling procedure was employed; rather, all areas not disturbed by strip mining activities were examined on foot. Each site was coded for computer analysis utilizing a modified range of geological, topographic, hydrological, pedological, floral, faunal and cultural variables

following Adovasio et al. (1975). After a series of computerized analyses, the resultant data were scrutinized for any patterns which may have been operant over the 16,000-19,000 year span of human occupation. Despite the fact that a relatively large percentage of the 231 sites produced no chronological diagnostics, it was possible to delineate changing patterns of drainage utilization over the entire occupational sequence. Moreover, the environmental and cultural parameters of the various sequent Cross Creek settlement systems can be elucidated in some detail. (45)

Garber, Emily H. (New Mexico) **FUTURALISTS AND PASTORALISTS: PLANNED MOBILITY AND STORAGE STRATEGIES AMONG HERDING PEOPLES.** While some researchers are asking interesting questions regarding pastoral adaptations and their identification within the archaeological record, many archaeologists, despite much evidence to the contrary, continue to see "pastoral nomadism" as a unidimensional type. If we are to "see" pastoralism in the archaeological record we must know what to look for. The ethnographic literature is helpful in this regard. The conditions under which specific pastoral strategies will be selected are best understood through analyses of various mobility and storage options both within and between groups. Intra- and inter-group variability is not based upon "cultural whim" nor is it unpredictable. (12)

Garber, James F. (Southern Methodist) **LONG DISTANCE TRADE AND REGIONAL EXCHANGE AT THE MAYA COMMUNITY OF CERROS IN NORTHERN BELIZE.** The Maya site of Cerros functioned as a community from the Late Preclassic to the Postclassic Period. The nature of this community shifts from a political, religious, economic center during the Late Preclassic, to domestic activity in the Classic, to domestic and religious activity in the Postclassic. A study of the artifacts has shown how these changes have affected the kinds of material culture that was acquired and consumed during each period. (51)

Gendel, Peter A. (Wisconsin-Madison) **A TEST OF MICROWEAR ANALYSIS ON EXPERIMENTAL STONE TOOLS.** The results of a blind test of microwear analysis are presented. The analysis of 23 experimental flint implements, including both retouched and unretouched examples, indicates that functional identifications can be achieved with a high degree of reliability. Using microscopic techniques described by L. H. Keeley, it is possible to distinguish polishes created by the working of specific materials such as dry hide, bone and antler and wood. Observations and success rates are reported for the portion of the tool used (92% correct), the activity (84%) and the material worked (74%). (49)

Gerhardt, Juliette J. (Texas-Austin) and Norman Hammond (Rutgers) **CUELLO 1978-1980: A SUMMARY.** A Cuello, a small site in northern Belize, has demonstrated the stratigraphic succession of Early Formative through Late Classic periods. The ceramic sequence matches those from other sites as far back as the Middle Formative, and the underlying Early Formative Swasey Phase is anchored by a number of radiocarbon dates in the millennium 2000-1000 BC. Excavations in 1978-80 amplified the results of previous work and demonstrated that a formal public precinct developed by the mid-second millennium BC, with further elaboration occurring in the Late Formative around 400 BC. The presence of jade and obsidian from the late second millennium indicate distant resource procurement, while plentiful carbonized plant remains document the diet. (3)

Gerlach, S. Craig (U.S. Geological Survey, Brown) and Arthur E. Spiess (Maine Historical Preservation Commission) **COMPARATIVE STUDIES OF CARIBOU EXPLOITATION STRATEGIES AT TUKUTO LAKE, NORTHERN ALASKA: THE CROXTON CARIBOU KILL.** This study analyzes the faunal remains from the Croxton site, an important prehistoric locality situated on the shore of Tukuto Lake in the National Petroleum Reserve—Alaska. Radiocarbon determinations bracket the primary occupation at Croxton between AD 900-1200, a period for which there are no other known cultural expressions in the Arctic Foothills. Faunal remains are analyzed in terms of certain recently generated hypotheses about the nature of high-latitude economic systems in general, and the human behavioral correlates of patterning as expressed at special purpose localities in particular. Using reconstructed caribou population data from previously excavated late prehistoric/historic sites at Tukuto as a basis for comparison, an effort is made to model the relationship between herd dynamics and stability and change in human exploitative practices. (28)

Gero, Joan M. (Massachusetts-Amherst) **CROSS-CULTURAL GENDER BIAS IN ARCHAEOLOGY.** Sexual divisions of labor in North American archaeological research have recently been documented. This paper offers a broader perspective on male and female roles in archaeology, demonstrating that in other societies, sex biases and sexual dichotomies of research roles are less evident. The possibility that other types of biases such as rigid class determinations may sometimes supercede gender bias is considered, and implications for interpreting North American sex role definitions are examined in this light. (31)

Gibson, Eric C. (Texas-San Antonio) and Harry J. Shafer (Texas A&M) **LATE CLASSIC MAYA SETTLEMENT AT KICHPANHA, NORTHERN BELIZE.** Recent research at Kichpanha, previously classified as a Late Preclassic minor ceremonial center, is reported. The 1981 Colha Project conducted extensive investigations in the recently cleared eastern portion of the site. Forty-six structures were mapped and collected, including house mounds, plazuelas and a large plaza group. At the eastern extremity of Kichpanha, one small lithic workshop was excavated. Results of comprehensive lithic studies of raw material selection, technology, typology and microwear are also presented. The evidence indicates that the most intensive use of this site occurred during the Late Classic. (51)

Gibson, Terrance H., Clifford G. Hickey and Richard T. Will (Alberta) **THE USE OF MICROCOMPUTERS IN ARCHAEOLOGICAL RESEARCH.** Archaeological sites on Banks Island, N.W.T. were investigated by integrating field methods with the data storage and manipulation capabilities of an Apple II 48K microcomputer. Sites were photomapped, and handwritten record sheets were also kept so that individual artifacts could be recognized from photographs. Microcomputer software was developed to accept data derived from photographs and recording forms. In addition, artifact location was plotted using a graphics tablet integrated with the software. Over 18,000 described specimens have been mapped from one site. Preliminary analysis indicates that many kinds of questions regarding human activity can be addressed using this system. (8)

Gilman, Patricia A. (New Mexico) **DETERMINING ROOM AND FEATURE FUNCTION.** Determining room and feature function is a key aspect in ascertaining the meaning of architectural change. However, most studies of room and feature function have selected attributes which only determine function in some, but not all, cases. This study focuses on the architectural correlates of food storage, particularly grains and legumes. Data from ethnographic surveys and agronomic literature are used to set up a series of criteria which are useful for determining patterns of storage in the archaeological record. Architectural material from the Black Mesa Archaeological Project, northeastern Arizona, and from the Mimbres River Valley, southwestern New Mexico, are considered in light of these cross-cultural criteria in order to ascertain how storage facilities changed through time in the prehistoric Southwest. (4)

Gladfelter, Bruce G. (Illinois-Chicago Circle) **ALLUVIAL CONTEXTS OF ARCHAEOLOGY: WHAT DOES IT ALL MEAN?** Reconstruction of the alluvial setting of an archaeological occupation relies heavily upon interpretations of the sediments, the paleogeomorphic setting of their site-specific and local depositional environments, and the distribution and condition of the recovered artifacts. Investigations of surface landforms and subsurface alluvial units document the sedimentological contexts, interpretations of which are based on contemporary models of depositional facies. An understanding of fluvial processes and related forms is an essential prerequisite for reconstructing the landform situation of a site, assessing the completeness of the recovered archaeology, establishing correlations and chronologies, interpreting hydrologic conditions and predicting the whereabouts of undiscovered archaeological sites. (50)

Goad, Sharon I. (Louisiana State) **POVERTY POINT, THE 1981 EXCAVATIONS: EVIDENCE OF SUBSISTENCE AND HABITATION.** The 1980-81 excavations in the ridge 1, NW sector at the Poverty Point site have produced data relevant to the interpretation of subsistence and habitation. This paper presents these findings and discusses them in relation to the Late Archaic Period in the southeastern United States. (39)

Grady, James (WCRM, Boulder) **SMALL FORMAT AERIAL PHOTOGRAPHY FOR THE COST CONSCIOUS ARCHAEOLOGIST.** Aerial photography has long been used to discover and document archaeological sites and their settings throughout the world. While the archaeological community has long been aware of aerial photography's ability to supply useful data, it has ignored aerial photography because of its costs. Modern automated 35mm cameras, power winders and motor drives and the new long (72 exp.) rolls of 35mm film mean archaeologists can be equipped for mapping for a comparatively small sum. Use of 35mm aerial photography in a number of earth science disciplines will be discussed, and comparisons between 3" x 5" enlargements from 35mm frames and 9" x 9" contact prints will be made. (52)

Graham, Martha, Carol Raish and Lynne Sebastian (New Mexico) **SITE STRUCTURE AND NUNAMIUT ETHNOARCHAEOLOGY.** The purpose of ethnoarchaeological studies of site structure is to identify patterns of space use among living peoples and account for these patterns in terms of specific controlling variables. If the link between observed patterns and controlling variables is strongly supported, an argument can be made that similar patterns recovered archaeologically resulted from similar conditions. This study examines patterns of spatial organization observed in Nunamiut Eskimo cold weather occupations and also examines two potential controlling variables for the observed patterns. The applicability of the patterns is then studied in terms of archaeological case examples. (4)

Graham, Russell W. (Illinois State Museum) EVOLUTION OF LATE QUATERNARY BIOTIC COMMUNITIES: HUMAN RESPONSE. The late Glacial biota of North America has no modern analog and in fact the biomes that are evident today probably evolved less than 8,000 years ago. Evolution of these modern biomes progressed as individual species responded to late Glacial climatic changes in accordance with their own tolerance limits. Therefore, human adaptive strategies did not merely "track" discrete and immutable biotic zones that were displaced spatially and temporally. Instead, adaptive strategies had to be sensitive to subtle changes in species composition of communities. Therefore, the accuracy of the direct application of the Ecosystem Similarity Concept in modeling human adaptive strategies to late Quaternary environments is time-dependent and it may not even be relevant to late Glacial environments and cultures. (19)

Graham, Russell W. (see Kay, Marvin) (53)

Gramley, R. Michael (Buffalo Museum of Science) GRAVERS AND DENTICULATES FROM THE VAIL PALEOINDIAN SITE. The Vail Paleoindian site in northwestern Maine, belonging to the Clovis archaeological culture, yielded over 200 gravers and denticulates to excavators. Within this tool class are a series of gravers and denticulates produced by snapping rather than by fine retouching. Little attention has been paid to these tools by other workers. The technique of production, however, may have high classificatory value and in the New World may be characteristic only of Paleoindian cultures. (35)

Grayson, Donald K. (Washington) SOME TESTS OF THE OVERKILL HYPOTHESIS. Although the hypothesis that human activities played a major role in causing the extinction of numerous Pleistocene mammals has been popular for over a century, the recent popularity of this hypothesis stems from the detailed arguments of Paul S. Martin. A series of archaeological and biological tests of Martin's hypothesis, as it has been applied to North America, is presented. The hypothesis passes some of these tests, including one commonly used to falsify it, but fails others. It is concluded that the underlying cause of the decline of the North American megafauna must lie in climatic change. (19)

Greber, N'omi (Cleveland Museum of Natural History) A CONTINUITY MODEL FOR THE DISTRIBUTION OF MANUFACTURED ITEMS. A mathematical model of the distribution of a manufactured item among a finite number of bounded, disjoint (but possibly contiguous) regions is developed. This model is based upon a simple continuity principle: the rate at which an object accumulates within a region is equal to the rate at which the object is manufactured within the region plus the rate at which it enters the region minus the rate at which it leaves. In order to solve the resulting set of differential equations assumptions must be made concerning interactions among regions and/or objects. Parameters used in this study include rate of manufacture and population size. Calculations are presented which use known archaeological data sets as illustrations of the model. (37)

Green, Stanton W. and Marek Zvelebil (South Carolina) BRIDGING THE ATLANTIC: A CRITICAL OVERVIEW OF AMERICAN AND EUROPEAN ARCHAEOLOGY. This paper provides a critical discussion of American and European approaches to the study of culture change. Despite some clear historical differences in scientific approach there is no simple descriptive American/European dichotomy in archaeology. American research has relied heavily on anthropological concepts and ethnographic models; while European archaeologists have emphasized archaeological cultures. Both schools have utilized economic models, though Americans have emphasized ecosystemic models, while Europeans have utilized paleoeconomic and marxist models. Both sides have recently undertaken attempts to involve social variables in their interpretive efforts. This paper will critically discuss these approaches from a general and historical point of view, as well as through a preview of the papers in the symposium. (2)

Gregory, David A. (Arizona State Museum) THE MORPHOLOGY OF PLATFORM MOUNDS AND THE STRUCTURE OF CLASSIC PERIOD HOHOKAM SITES. Platform mounds and the compounds associated with them are major architectural features found in large Classic Period (AD 1150-1450) Hohokam sites in the lower Salt and Gila river valleys. Observed regularities in the morphology of platform mounds and their associated compounds are illustrated and discussed. Patterning in the spatial relations between platform mounds, associated compounds and ballcourts within individual sites is also suggested. The implications of the observed patterns are examined in terms of the function of platform mounds, the growth and development of the large Classic Period sites and the nature of Classic Period Hohokam sociopolitical organization. (15)

Gresham, Thomas (see Elliot, Dan) (53)

Gretler, David J. (see Kolb, Charles C.) (55)

Grimes, John R. (Peabody Museum of Salem) HAFTED MICROTOOLS FROM THE BULL BROOK PALEOINDIAN SITE. Among the ca. 9,000 stone tools recovered from the Bull Brook site in Massachusetts are several lesser known minority types which occur in sufficient numbers to allow detailed technological analysis. Among these are drills with unidirectional bits and whittling tools, both used in a haft, indicative of a well developed bone and/or wood working industry. Their sophistication has negative ramifications for the traditional image of a paleoindian lithic technology strictly adapted to procurement and processing of big game. It is suggested that study of such minority forms is fundamental not only to an understanding of paleoindian lifestyles, but also to demonstrating relationships between paleoindian assemblages and their possible continuity with Old World technologies. (35)

Grimm, Linda Taranik (Oberlin) PATTERNS OF STONE TOOL MANUFACTURE AND USE IN THE UPPER PALEOLITHIC OF SOUTHWESTERN FRANCE. The technique of reconstitution analysis—refitting lithic remains in order to make inferences about the processes underlying stone tool manufacture and use—is employed in a comprehensive study of lithic artifactual remains (i.e., retouched stone tools and debitage) from the Beauronnian, or IVb level, at the open-air site of Solvieux, Dordogne, France. In the present analysis, this technique is one of several distinct approaches being used to isolate functionally significant patterning in the horizontal distributions of flint tools, debitage, and associated archaeological features within an occupational episode that dates to an early phase of the Upper Paleolithic succession. (35)

Guilday, J. (Carnegie Museum) and P. Parmalee (Tennessee) VERTEBRATE FAUNAL REMAINS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. The vertebrate faunal remains from Meadowcroft Rockshelter (36WH 297) indicate a vigorous raptor (primarily owl) roost and a continuing but intermittent Indian occupation throughout the faunal sequence. Ecological analysis by stratum suggests that the major features of the temperate biota, and by inference the vertebrate resources of the human inhabitants of the rockshelter, remained unaffected by minor climatic adjustments from ca. 9000 BC (11,000 BP) until the Historic Period. The Meadowcroft faunal assemblage includes both specimens deposited by raptorial roosting birds and by human occupants of the rockshelter. White-tailed deer (*Odocoileus virginianus*) dominates the Indian refuse component. Paleoclimatic and biogeographic implications of the Meadowcroft archaeofauna are discussed in the light of other mid-Appalachian late Pleistocene/early Holocene sites. (45)

Guilday, J. (see Carlisle, R. C.) (45)

Gunn, J. D. (see Adovasio, J. M.) (19) (45)

Gyrisco, Geoffrey (Historic Preservation, D.C.) TOOLS TO PRESERVE ARCHAEOLOGICAL RESOURCES. The isolation of the study and preservation of archaeological resources from the larger natural resource conservation and historical preservation movement is a major contributor to the continuing destruction of the nation's irreplaceable resources. Ecological, scenic, architectural and archaeological resources frequently occur together. They need to be perceived and preserved as a whole. This is possible if existing laws, programs and conservation and preservation concepts are applied more effectively in urban, suburban and wilderness areas. Historic districts and landmark ordinances can and should be used to protect archaeological resources as well as historic buildings. The need to preserve more archaeological sites exists and should be used more frequently than data recovery. (14)

Hajic, Edwin R. and Thomas R. Styles (Center for American Archeology) DYNAMIC SURFICIAL GEOLOGY OF THE LOWER ILLINOIS VALLEY REGION AND THE IMPACT ON THE ARCHAEOLOGICAL RECORD. It is critical that researchers in the region respect the fact that the archaeological record was fundamentally shaped by coevolving surficial geologic systems. The magnitude of landscape change was large enough to strongly modify the distribution of basic resources and thus the spatial patterning of prehistoric human activities. Preservation of the record of these activities was profoundly influenced, and often distorted, by erosion or burial of large areas of former land surfaces. While the general pattern through most of Holocene time is one of decreasing rates of land surface modification, historic period destabilization has reversed this trend dramatically with damaging impact upon the archaeological record. (1)

Hale-Pierce, Carolyn A. (SUNY-Buffalo) WHERE DO WE GO FROM HERE? THE SMALL-SCALE SURVEY REVISITED. This paper introduces the problems relevant to small-scale archaeological surveys, which comprise the bulk of archaeological investigation being conducted in the United States today. These problems include the utility of small-scale surveys in research, the viability of eliminating certain small-scale surveys altogether, methodological considerations and the roles of contractors, institutions, archaeologists and agencies. A symposium held in 1978 ex-

amined similar problems. The panel today reexamines that symposium and offers new solutions to extant problems as well as to those which have arisen in the past four years. (40)

Hall, Edwin S. (U.S. Geological Survey, SUNY-Brockport) **ARCHAEOLOGICAL RESEARCH IN NORTHERN ALASKA: AN OVERVIEW**. Investigations of the archaeological resources in northern Alaska began in the late 1800s and progressed through four distinct periods characterized by geographic focus and specific research concerns: the Coastal Pioneer period (1881-1946), the Interior Pioneer period (1947-1969), the Alyeska Pipeline Period (1970-1975) and the Cultural Resource Management period (1976-present). Consideration of the data recovered during 100 years of archaeological investigation permits formulation of a tentative culture historical framework and suggests some directions for future fieldwork. (28)

Hall, Robert L. (Illinois-Chicago Circle) **WATER-WATER EVERYWHERE: ATL-ATL FINGERHOLES AS EYE METAPHORS IN MESOAMERICA AND NORTH AMERICA**. Spearthrower fingerholes were figurative eyes and as such carried some of the symbolic load of eyes as they were seen to relate to springs, waterholes, cenotes and underworld entrances. The structural equivalency of much hitherto unrelated Mesoamerican and North American symbolism is demonstrated. Specifically mentioned are the three-striped eye of Xipe, the goggle eye of Tlaloc, the turquoise glyph and kan cross, the mirror on the foot of Tezcatlipoca, the relationship of the atlatl to fertility, the etymology of atlatl, nonagricultural associations of Xipe, the roseate spoonbill as a transformation of Xipe and as a Hopewellian motif and North American/Mesoamerican interaction. (42)

Hally, David J. (Georgia) **THE VESSEL ASSEMBLAGE IN ARCHAEOLOGICAL RESEARCH**. The vessel assemblage is defined as the array of morphologically and functionally differentiated pottery vessels that exist to meet the needs of a particular society, community or household. General features of vessel assemblages in noncomplex societies, suggested by ethnographic studies of contemporary pottery-using communities, are discussed. Analysis of pottery collections derived from two 16th century aboriginal sites in northwestern Georgia demonstrates that vessel assemblages can be reconstructed from archaeological collections. Similarities between the ethnographically and archaeologically documented vessel assemblages are discussed. The research potential of vessel assemblage analysis is discussed. (55)

Halstead, Paul (Cambridge) **RECENT APPLICATIONS OF ADAPTIVE/ECOLOGICAL MODELS: A VIEW FROM THE RIGHT SIDE OF THE ATLANTIC**. This paper argues that adaptation to short-term (inter-annual) environmental variability is of particular importance for an understanding of culture change, and that small-scale (local) environmental variability plays a major role in such adaptation. Within this framework arguments about optimizing versus satisficing strategies in human adaptations are seen as a theoretical "red herring". Human ecology subsumes human social behaviour, as a consequence of which ecological models of culture change should not be seen as narrowly exclusive of, or in opposition to, social models. (2)

Hamilton, Nathan D., James B. Peterson and Alan McPherron (Pittsburgh) **LATE WOODLAND PERISHABLE INDUSTRIES OF THE JUNTUNEN SITE, UPPER GREAT LAKES**. Perishable fiber industries, including cordage, fabrics and basketry, were utilized to decorate Late Woodland ceramics in the Upper Great Lakes. This research has examined ca. 350 ceramic vessels impressed with perishable materials from the Juntunen site (at the Straits of Mackinac located between Lake Michigan and Lake Huron). Detailed attribute analysis of the diverse perishables has been undertaken on the level of "vessel lots," enabling correlation of both perishable and ceramic attributes. Analysis and interpretation has focused on the structural types of perishables in both temporal and spatial frameworks of Upper Great Lakes prehistory. (39)

Hammond, Norman (Rutgers) **SETTLEMENT PATTERNS IN NORTHERN BELIZE**. Intensive survey by a number of projects over the past decade has resulted in the ancient Maya settlement pattern of northern Belize being among the best documented in the Maya lowlands. The geomorphological and pedological structure of the region is well understood, consisting of folded limestone ridges with overlying Miocene sands in places, and a vegetation pattern of rain forest with areas of pine savanna is general, though now relict in only a few places. Ancient settlement is mainly on the ridges, especially in the western portion of the area, and includes sites of major ceremonial center status as well as small loci. The paper describes this pattern and relates it to topography and communications. (3)

Hammond, Norman (see Gerhardt, Juliette J.) (3)

Hanen, Marsha and Jane Kelley (Calgary) **SOCIAL AND PHILOSOPHICAL FRAMEWORKS FOR ARCHAEOLOGY**. Archaeologists are extending their scrutiny of sociological aspects of archaeology beyond Thomas Kuhn and into substantive sociological issues within their own discipline. Some views portray science as being entirely shaped by sociological factors rather than by considerations of truth and justification. More generally, recent history and philosophy of

science has moved from exclusive attention to conceptual analysis toward taking account also of the social aspects of science. The significance of this trend for scientific theory in general is discussed, and its implications for archaeological theory explored. As well, some evaluation of these directions is attempted. (31)

Hannus, L. Adrien (South Dakota State) **EVIDENCE OF MAMMOTH BUTCHERING AT THE LANGE/FERGUSON (39SH33) CLOVIS KILL SITE**. The site represents the first substantiated evidence of Clovis hunters in direct association with butchered bones of mammoth and other megafauna in the Dakotas. Several lines of evidence, both taphonomic and artifactual, exist to corroborate the incidence of killing and butchering activity at the Lange/Ferguson (39SH33) Site. A large number of flake blades produced on heavy mammoth bone have been recovered including several which were tightly wedged into thoracic vertebrae. Additionally, several segments of mammoth bone representing prepared cores, and exhibiting the removal of long channel flakes were recovered. A minimal C-14 determination of $10,670 \pm 7,300$ BP has been reported. (34)

Hansen, Eric (SUNY-Buffalo) **SMALL-SCALE SURVEYS AND REGIONAL-LEVEL RESEARCH**. In this paper a strategy for utilizing aggregated data from small-scale surveys in addressing regional-level research questions is outlined. Each survey is treated as an independent sample of the research universe (western New York) and information on site locations, size, chronology, topography and climate are coded for computer manipulation. Distribution maps of indices constructed from the coded data are compared to expected distributions deduced from ecological theory. The research potential of this strategy is founded upon the notion that the whole is greater than the sum of its parts; that when taken together the many small-scale surveys done over the past two decades provide a more than adequate sample for studying regional-level cultural patterns. (40)

Hard, Robert J. (Ft. Bliss) **TARAHUMARA ETHNOARCHAEOLOGY**. The Tarahumara Indians of Southwest Chihuahua, Mexico utilize rockshelters for winter habitation as part of a transhumanant cycle. Other Tarahumaras do not practice this transhumanant cycle and only occupy a single house throughout the year. A comparison of the organization and content of rockshelters and houses suggests that the cycle of domestic activities that are a part of Tarahumara adaptations directly condition the organization and content of residences. The implications of this research for understanding the functions of archaeological sites is examined. (4)

Harpending, Henry C. (see Sattenspiel, Lisa) (8)

Harrold, Francis B. (Texas-Arlington) **THE CHATELPERRONIAN AND THE MIDDLE-UPPER PALEOLITHIC TRANSITION**. The Chatelperronian industrial tradition, along with the Aurignacian, marks the beginning of the Upper Paleolithic in much of France and Spain. Distinct from both the Aurignacian and the preceding Mousterian, the Chatelperronian is best characterized as Upper Paleolithic rather than transitional. The thesis that it emerged from the Mousterian has been strengthened by its recently confirmed association with Neanderthal man, but the transition was apparently rapid, and roughly coincided with the arrival of the Aurignacian. (6)

Harshbarger, Karl (see Ingersoll, Daniel W., Jr.) (26)

Hasenstab, Robert J. and David M. Lacy (Massachusetts-Amherst) **THE ROLE OF SMALL-SCALE SURVEYS: ISOLATED REPORTS OR INTEGRATED RESEARCH?** This paper examines the role of small-scale surveys in Massachusetts in fulfilling the goals of CRM. Since these surveys constitute the bulk of the archaeology conducted in this and neighboring states, the ultimate value of the CRM program hinges on the integration of small survey results into a regional research framework. Evaluation of survey reports from Massachusetts (1970-1979), however, indicates that post hoc integration is difficult, if not impossible, given present problems in survey reporting. These problems may be minimized in the future through changes in the intensity and orientation of background research, and through improvements in aspects of report specificity. (40)

Hasenstab, Robert J. (see Lacy, David M.) (31)

Hassan, Fekri A. (Washington State) **FLUVIAL SYSTEMS IN ARID REGIONS**. Short- and long-term variations in the climatic conditions in arid regions leads to marked changes in water availability and vegetation, which influence alluvial processes. Reconstruction of riverine environmental conditions and the climatic ecologic conditions of arid regions is best served by detailed geomorphological, stratigraphic, sedimentological and pedological investigations. Climatic/morphogenetic and facies models provide a useful framework for analytical and interpretive work. (50)

Hassen, Harold (Center for American Archeology) **DETERMINING SITE ACTIVITY AND SPATIAL PATTERNING IN A DISTURBED CONTEXT**. The focus of this study will be to demonstrate that

despite the effects of plowing and lumbering, an analysis and comparison of features and midden materials can serve to isolate types of activities represented and identify patterns of artifact disposal. The study will examine material collected from a Late Archaic/Late Woodland blufftop habitation site situated in westcentral Illinois. The analysis will be conducted at two levels: (1) multiple gridded surface collections within a plowed field will be examined for artifact clusters and their association with subsurface pit features will be examined, and (2) within nonplowed portions of the site, a comparison will be made between excavated pit features and their surrounding matrix. (1)

Hastings, Charles M. (Michigan) HIGHLAND SETTLEMENTS IN EASTERN FORESTS: LATE INTERMEDIATE COLONIZATION OF THE CENTRAL PERUVIAN CEJA DE MONTAÑA. Andean verticality is discussed with reference to a recent archaeological survey in the provinces of Tarma and Chanchamayo. Transition zones between sierra and Amazonia were settled by the Late Intermediate Taruma culture at the margins of its territorial expansion. The Taruma population in the eastern flanks of the Andes is viewed from the perspective of being a distinct subgroup, rather than as a transhumant labor force from the Tarma highlands or a heterogeneous collection of workers representing diverse villages or political leaders elsewhere. Settlement and subsistence patterns of this subgroup are examined with supporting ethnographic data from local traditional communities. (46)

Hathaway, J. Holly (see Eighmy, Jeffrey L.) 47)

Hayden, Brian (Simon Fraser) FROM CHOPPER TO CELT: THE EVOLUTION OF RESHARPENING TECHNIQUES. Different techniques which are used for resharpening stone tools are viewed as being responses to three major variables: (1) cutting requirements, (2) the frequency with which lithic tools must be replaced and (3) the availability of lithic raw materials. Largely because cutting requirements increased over time together with advances in wood technology, the resharpening mode changed from hard-hammer percussion, to soft-hammer percussion, to the secondary resharpening of flakes, to pressure resharpening and finally to edge grinding. (13)

Haynes, C. Vance (Arizona) THE STRATIGRAPHIC EVIDENCE OF PLEISTOCENE EXTINCTION IN THE UNITED STATES. The stratigraphic abruptness of the end of the Rancholabrean megafauna is the most impressive aspect of Pleistocene extinction. At many sites across the United States it occurs at a marked stratigraphic break representing an erosional hiatus between 12,500 and 11,500 BP. During this time, coeval with the final stage of deglaciation, streams underwent net degradation, water tables declined, major vegetation changes occurred, and Clovis hunters appeared. All of these factors are probably significant to the cause of extinction, but the reduction of traditional watering places at the time when human predators were added to the scene may have been the main factors in extinction occurring when it did. (19)

Haynes, Gary (Smithsonian) ON WATERING HOLES, MINERAL LICKS, DEATH AND PREDATION. Some Pleistocene bone collections from North America are examined using new taphonomic perspectives, including Paleoindian and pre-Llano site materials. Important variables in the dynamics of past ecosystems are reflected in natural modifications to bones and assemblages, some of which have been mistaken for the effects of human behavior. These modifications can be deciphered to distinguish true kills from scavenges, to indicate local prey vulnerability towards predation, to identify genera or families of carnivores and scavengers without the necessity of finding bones of these animals themselves and to clarify local conditions of bone accumulation in the past. (19)

Hays, T. R. (North Texas State) CURRENT RESEARCH ON THE NEOLITHIC OF THE CENTRAL SUDAN. This paper reports the preliminary results of recent field work undertaken in the Republic of Sudan. The research was focused on the late prehistoric cultural development east of the Nile River Valley in Central Sudan. Specifically, the project considered: (1) the degree to which Neolithic traits (pottery, domesticated foods) spread eastward from the Nile or westward to the Nile, (2) the past grasslands of Central Butana played as a barrier or interaction zone and (3) the complex cultural development near the Atbara River at the end of the Neolithic period. Tentative conclusions regarding the evolution of the Neolithic economy in a marginal environment are presented. (18)

Hayward, Michele H. (Pennsylvania State) IMPROVED METHOD OF RECORD LINKAGE USING COLONIAL MEXICAN PARISH RECORDS. Studies that have presented an outline of the growth and decline of the colonial Mexican Indian population have been criticized for (1) too much generality and (2) insufficient attention to inaccuracies in the data. To obtain a more specific and accurate understanding of population changes, parish records have also been used. A principal problem with these records is that individuals do not possess surnames. Here, a method is presented whereby records may be linked without the use of surnames. Methodological problems

are discussed. With this improved method, more sophisticated demographic analyses can be undertaken using parish records as a data base. (42)

Healy Paul F. (Trent) AN ANCIENT MAYA DAM IN THE CAYO DISTRICT, BELIZE. In recent years there has been a growing awareness of the advanced hydraulic engineering skills of the ancient lowland Maya. A significant amount of research has focused upon their sophisticated abilities to use and control water for cultivation, trade, transport, defense and rituals. Although water control techniques such as canals, wells and reservoirs are known from a multitude of Maya sites, there has been little discussion of ancient Maya dams. This paper suggests that Maya dam building may have been more widespread than previously estimated, and one such feature, discovered in 1980, is examined in detail. A description of the construction, its size, age and probable function is included along with a comparison to other, similar hydraulic features in the Maya subarea and in central Mexico. (51)

Heath-Smith, Cynthia M. (Illinois) RESOURCE UTILIZATION AND SITE LOCATION IN WESTERN MORELOS, MEXICO: A DIACHRONIC PERSPECTIVE. An analysis of site location and natural resource exploitation in the Rio Chalma drainage of western Morelos, Mexico is presented. Data from the Formative through the Postclassic are employed in the reconstruction of diachronic patterns of resource use, with a focus on those resources relating directly to subsistence activities. Most models of resource utilization and the development of civilizations in the central Mexican area have centered solely on the Basin of Mexico. This material from the adjacent region of western Morelos gives some perspective to the Basin of Mexico data and contributes to an overall understanding of cultural evolution in central Mexico. (42)

Henry, Donald O. (Tulsa) PREHISTORY OF SOUTHERN JORDAN. A prehistoric investigation in southern Jordan resulted in the discovery of 81 sites with occupations which spanned most of the Late Pleistocene and Holocene. A comparison of the cultural and environmental successions of the region with parallel sequences in the Levant reveals that the prehistoric inhabitants of southern Jordan interacted more strongly with populations of the northern Levant than with nearby southern Levantine groups. Only during markedly arid episodes were strong relations established with southern Levantine populations. Prehistoric interaction spheres within the region appear to have been influenced more by environmental setting than geographic proximity. (18)

Hester, Thomas R. (Texas-San Antonio) ARCHAEOLOGY AT COLHÁ, BELIZE. Three seasons of investigations (1979-1981) at Colhá, northern Belize, have demonstrated the presence of craft specialization associated with mass production of chert tools. Colhá was first occupied ca. 1000 BC; Swasey ceramics are characteristic of the early Middle Preclassic. Mass production of stone tools begins in the Late Preclassic, around 300 BC. Adze and celt forms were exported to the north. The Late Classic also evidenced tool mass production, based on a chert core-blade technology; additionally, it marks a time of major architectural expansion. The Classic ended violently at Colhá, with the succeeding Early Postclassic markedly different in terms of cultural traits. However, intensive stone tool production continued up to the time of site abandonment around AD 1100. (3)

Hewitt, John S. (Northwestern) MODELS OF EFFICIENT BEHAVIOR. A comparison of archaeological studies of behavioral adaptation in humans with studies of adaptation in other species by biologists and paleontologists will serve to establish the legitimacy of archaeological studies of efficient behavior, but will further show that models of efficient behavior are not likely to be pertinent in all circumstances. A comparison of archaeologically-recovered food remains from the Foster Site with predictions of diets derived from simple models of efficient behavior will be offered to demonstrate the utility of such models when rationally and modestly applied. (13)

Hickey, Clifford G. (see Gibson, Terrance H.) (18)

Hietala, Harold (see Marks, Anthony E.) (6)

Hildebrandt, William R. (San Jose State) NATIVE HUNTING ADAPTATIONS ON THE NORTH COAST OF CALIFORNIA. The north coast of California has long been considered the southern extent of the maritime dominated economies that are characteristic of the northwest coast culture area. The validity of this proposal is assessed through the development of a series of alternative hunting models that are tested against 16 late period sites. Based on these tests, an explanation of the causes of the various forms of coastal hunting as well as ethnographically-recorded forms of social organization are proposed. (56)

Hill, Sarah H. (Georgia State) A CONSIDERATION OF MANUFACTURE-DEPOSITION LAG IN URBAN SITE FORMATION. Manufacture-deposition lag, the difference in time between the manufacture and deposition of an artifact, represents a chronological interval and reflects

behavioral processes. These processes include patterns of artifact use and transformation within one or more behavioral systems. A method is proposed to calculate lag for glass bottles from historic sites. Hypotheses are generated based on expected frequency and immediacy of use in various functional categories. Testing the hypotheses contributes to behavioral interpretations at urban sites and to understanding urban site formation processes. (32)

Hoag, Paul W. (North Dakota) **ARCHAEOLOGICAL PHOTOGRAPHY: THE STATE OF THE ART.** The state of the art of archaeological photography is reviewed with special attention to satellite sensing, vertical aerial photography, oblique aerial photography and close-range terrestrial stereophotogrammetry. The place of photographic techniques within information gathering strategies is the focus. Practical considerations as well as links to more generalized archaeological methodology are discussed. A typology of archaeological problems amenable to photographic techniques is developed; metric as well as nonmetric applications are considered. The need for innovations in this archaeological subspecialty is detailed and directions for new research explored. An extensive, annotated bibliography is provided. (52)

Hodges, Richard (Sheffield) **PEER POLITY INTERACTION AND THE POLITICAL EVOLUTION OF MEDIEVAL ITALY.** In this paper the evolution of the 12th century city communes of North Italy will be considered. The existence of three political stages—steps towards the formation of the communes—will be proposed. Stage 1 describes the civic modules of the Migration Period (6th–8th centuries); stage 2 is concerned with the competing core areas within the Carolingian Empire (c. 750–c. 850), and stage 3 is concerned with the communes of the 10th century and later. The inter- and intra-policy interactions will be discussed in terms of ceramic, ecclesiastical and numismatic evidence for each stage to illustrate the importance of resource control. Finally, some comparison will be made between the modular evolution of the core area of medieval Europe and the very different political formations in the peripheral, secondary states of Europe at this time. (36)

Hoffman, Charles M. (Arkansas) **PROJECTILE POINT MORPHOLOGY: INFLUENCES OF MEASUREMENT TECHNIQUES ON DATA STRUCTURE.** Potentials for measurement error and ambiguity make objective estimates of projectile point morphology difficult to achieve. A concise but representative measure of point morphology can be obtained using polar coordinate measurements and principal components analysis. By precisely locating measurements and allowing multiple measures of complex forms, morphological variation and asymmetry can be represented accurately. Nevertheless, precautions should be taken to avoid generating artificial asymmetry and poorly defined or spurious factors. Using polar coordinate measurement with principal components analysis balances efficiency and directness of measurement technique with accuracy in portraying point morphology while reducing ambiguity and error in analysis. (37)

Hohmann, John W. (Arizona State) **SINAGUA MORTUARY RITUAL: INFERENCES IN PREHISTORIC SOCIAL COMPLEXITY.** Three hundred eighty-two burials and associated offerings are analyzed for evidence of social differentiation in northern Sinagua society. It is hypothesized that a change in Sinagua social organization and differentiation occurs between the Angell-Winona (AD 1066–AD 1100) and Elden (AD 1130–AD 1250) phases. It is demonstrated that during the Angell-Winona phase the society had limited stratification with high status predominantly held by adult males. By contrast, during the Elden phase the society was a complex stratified community in which members of selected families were given high status burials. Such change may be related to the growth and development of trade networks and the emergence of a merchant class. (25)

Holley, George R. (Southern Illinois) **ELABORATION AND CERAMIC CHANGE: A MORPHOMETRIC PERSPECTIVE.** The metric reduction of ceramic vessel form permits researchers to recognize and interpret subtle, elaborative changes. This study argues that a morphometric perspective, borrowed from physical anthropology, is a necessary complement in the analysis of form change. Definitions of elaboration, its measurement and statistical manipulation are discussed. The Classic Maya ceramic remains from Piedras Negras, Guatemala are used to illustrate the potential for this approach. (38)

Howard, Jerry B. (Arizona State) **HOKOKAM COMMUNITY ORGANIZATION AT LA CIUDAD DE LOS HORNOS.** Utilizing locational data on over 1,000 prehistoric features from La Ciudad de Los Hornos (AZ U:9:41 [ASU]), this paper analyses intra-site spatial relationships to identify changing patterns of community organization. This approach first identifies bounded units of functionally specific land use. Next, community structure is addressed on three levels: (1) the identification of primary functional subsets within bounded units, (2) an analysis of relationships between bounded units which form interactive "facility groups" and (3) the organization of all facility groups at the community level. Implications for changing sociopolitical organization are then examined. (15)

Huggins, Robert J. (see Nichols, Deborah L.) (47)

Hull, Frank (see Barber, Russell) (5)

Hunter, Richard and Michael Parrington (Louis Berger) **USING A SLEDGEHAMMER WITHOUT CRACKING THE NUT: INDUSTRIAL ARCHAEOLOGY IN TRENTON.** A phase II archaeological survey was carried out in 1981 in advance of the proposed construction of I-195, I-295, NJ 29 and NJ 129 in Trenton, NJ. The major emphasis of the survey was the Abbott Farm National Landmark, but this paper deals with an adjacent industrial district close to the falls of the Delaware River. The industrial district, which includes an early Cooper-Hewitt ironworks, a number of 19th century mill sites and a complex water power system, is located in an area of intensive early historic and prehistoric activity. This paper examines the problems of using gross excavation techniques while maintaining sensitivity to fragile early historic and prehistoric remains. (7)

Ingersoll, Daniel W., Jr. and Karl Harshbarger (St. Mary's) **WHY A YELLOW RIBBON?** This paper examines the yellow ribbon phenomenon which preceded and followed the release of the American hostages from Iran in January, 1981. The questions here concern the suitability of the yellow ribbon as a material referent and as an expressive symbol. The yellow ribbon, made famous by the Orlando song, is identified as an analogue for the wedding ring, a symbol of lasting union. Evidence from myth, text and social science serve to illustrate the link by analogy and to define the source of symbolic power. Dual oppositions and ritual transformations in color and object symbolism are discussed. (26)

Irwin-Williams, Cynthia (E. New Mexico) **ARCHAEOLOGICAL VISIBILITY AND THE RECOGNITION OF PATTERNED BEHAVIOR FOR DESERT HUNTERS AND GATHERERS.** The problem of the variable archaeological visibility of desert hunters/gatherers has long been recognized as a critical one in the recognition and explanation of prehistoric behavior. The record of the desert foragers of the southwestern U.S. provides an excellent example of the problem. At the heart of the dilemma is the concept of the archaeological "site" as it is currently employed. A new conceptual framework for dealing with desert hunter-gatherers is proposed, and the derivative methodology and initial field experiments are outlined. Implications of the approach for understanding both contemporary and ancient hunter-gatherers are explored. (53)

Isbell, William H. (Binghamton) **EMERGENCE OF STATE ADMINISTRATION AT HUARI, PERU.** Huari became the capital of an expansionist state shortly after AD 500. Archaeological research indicates that its first steps toward centralized, hierarchical administration were preceded by a strategy of colonization in ecologically contrastive regions. The transformation to centralized, secular bureaucracy was stimulated by religious beliefs developed at Tiwanaku, Bolivia. However, Tiwanaku religion was not adopted at Huari. Rather, the hierarchical and centralized structure of Tiwanaku's religious system was combined with Huari's traditional strategy of economic colonization to produce a uniquely Andean form of political administration. (46)

Jeffries, Richard (see Morrow, Carol A.) (13)

Jelinek, Arthur J. (Arizona) **SOME ASPECTS OF MIDDLE PALEOLITHIC TECHNOLOGY IN FRANCE AND IN THE LEVANT.** A recent analysis of metric variables of complete flakes from the deep stratigraphic sequence at the Tabun Cave shows a progression through time in the ratio of width to thickness. The results from Tabun are compared with similar analyses of data from samples from deep stratigraphic sequences at Combe Grenal, Pech de l'Aze, Roc de Combe and Orgnac III in France. (6)

Jermann, Jerry V. (Washington) **SAMPLING AND SPATIAL AUTOCORRELATION: PROBLEMS IN REPLICATING SPATIAL PATTERN FROM SAMPLE DATA.** Archaeologists almost universally presume that sample data adequate for characterizing the contents of their research universe also yield reliable estimates of that data's spatial patterning. A factorial experiment is described that examines variability in adequacy of spatial rendition attributable to the fixed effects of sample selection procedure and size. Results obtained for populations exhibiting marked differences in spatial autocorrelation demonstrate that reliability of spatial interpolations is dependent upon a target population's underlying dispersion. The significance of experimental results to archaeology's emergent geographic paradigm is discussed, and guidelines for sample designs that attend spatial problems are offered. (8)

Jeter, Marvin D. (Arkansas Archeological Survey) **THE PROTOHISTORIC "TILLAR COMPLEX" OF SOUTHEAST ARKANSAS.** A Native American mortuary complex flourished in the "delta" lands of southeast Arkansas during the AD 1400–1700 period. Cemetery sites containing more than 50 individuals, often accompanied by ceramic vessels or other grave goods, were excavated by the "Mound Survey" of the 1880s and by local collectors in recent decades, but have only recently

been subjected to comparative analyses. Also, surveys have been initiated to locate farmsteads and other sites which supported the mortuary complex. Although no ethnic identification is yet possible, there are indications of at least partial contemporaneity with Tunican and Quapaw (Arkansas) groups. (39)

Jewett, Roberta A. (Arizona State) A DESIGN ATTRIBUTE ANALYSIS OF HOHOKAM RED-ON-BUFF CERAMICS. An analysis of red-on-bluff ceramics from Las Canopas suggests that painted design elements are sensitive to temporal variation and that the traditional red-on-bluff typology is in need of reevaluation. Quantification of attributes suggests that important variables used to define traditional types do not cooccur regularly or exhibit constant rates of change. The nature of stylistic change in the Pioneer-Colonial periods and the implications for the existing prevalent chronology and ceramic manufacture and distribution in the Gila-Salt area are discussed. (15)

Johannessen, Sissel (Illinois) PALEOETHNOBOTANICAL TRENDS IN THE AMERICAN BOTTOM. Archaeological trends in the American Bottom represent a long dynamic history of preColumbian occupation, beginning with the hunting and gathering cultures of the Archaic, and culminating in the complex farming societies of Mississippian times. The FAI-270 Project has excavated 82 sites situated in diverse habitats and ranging in time from about 2600 BC to 1300 AC. Current paleoethnobotanical investigations are concerned with delineating the changing man/plant relationships throughout this time span. Data on the floral material recovered from 36 cultural components are presented, focusing upon the temporal and spatial variation occurring in the pattern of plant remains. (11)

Johnson Jerald J. (California State, Sacramento) and Dorothea J. Theodoratus (Theodoratus Cultural Research) THE DUTCH GULCH LAKE PROJECT: A VIEW OF METHODOLOGICAL APPROACHES TO THE STUDY OF PREHISTORIC POPULATIONS THROUGH GREAT DEPRESSION POPULATIONS. An intensive archeological survey of 24,000 acres in the interior coast range of northern California was undertaken by the Archeological Study Center at California State University, Sacramento. In conjunction with this, Theodoratus Cultural Research personnel conducted detailed archival, ethnohistorical and ethnographic research among the Bald Hills Wintu and the historic Euro-American occupants of the region. The ethnographic/ethnohistoric component of the project is addressing questions of settlement/demographic patterns and changes in perceptions of the environment in the prehistoric and historic period and is seeking confirmation of hypotheses in the archaeological record. Findings and methodological aspects of integrated research will be discussed. (29)

Johnson, W. C. (Pittsburgh) CERAMICS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. The 1973-1977 excavations at Meadowcroft produced 420 ceramic sherds and spalls. All ceramics are restricted to Stratum IV and above with the exception of a few obviously intrusive sherds in slumps along the back (north) wall of the shelter. The four basic types of ceramic wares originally described by Mayer-Oakes (1955a) for the Upper Ohio Valley are represented and include grit-tempered Half Moon ware, limestone-tempered Watson ware, grit-tempered Mahoning ware and shell-tempered Monongahela ware. The 420 sherds can be reduced to 44 reconstructed vessel "clusters": two Half Moon, 36 Watson, three Mahoning and three Monongahela vessels. The two Half Moon vessels represent the oldest dated ceramics in the Upper Ohio Valley and are directly associated with radiocarbon determinations of 865 ± 85 BC and 870 ± 75 BC. The cordage twist preference for the Watson ware is predominantly Z twist. Thirty-six of the limestone-tempered vessel clusters, all of the shell-tempered vessels and two of the three Mahoning ware clusters are tightly dated to the early Late Woodland period at the shelter between ca. AD 1025 \pm 65 and AD 1265 \pm 80, suggesting a heavy exploitation of the interior upland ecomiche during this time period. (45)

Jones, Marcia L. (Southern Methodist) THE SIGNIFICANCE OF INTRA-SITE VARIABILITY IN TECHNOLOGICAL INDICES: A TEST CASE. An increasing number of studies utilize technological indices to characterize and compare lithic assemblages. These studies frequently assume no intra-site variability in technological indices used for comparisons. Jelenik describes a trend in a technological index for Mousterian industries from the Levant which transcends typological variability. A sampling strategy is designed to test for spatial and temporal variability in this technological index using material from Rosh Ein Mor. The paper examines whether the variability within any particular assemblage is sufficiently small to allow definition of such a technological index and whether the Rosh Ein Mor material fits Jelenik's scheme. (37)

Joslin-Jeske, Robert (Northwestern) ECONOMIES IN RAW MATERIAL USE BY PREHISTORIC HUNTER-GATHERERS. This paper is an attempt to use lithic tools to build archaeological theory about human behavior by building a model of the need for hunter-gatherers to economize on lithic raw materials when resource supplies are constrained. As raw material becomes expensive, strategies such as standardized artifact forms, reduction in tool size, and an extension of tool

use-life should be used by hunter-gatherers using lithic tools. The model is tested using data from Mound City, Ohio, a Middle Woodland habitation and mortuary site. The analysis supports the model. (13)

Jurgensen, A., D. Clark (Material Sciences, Florida) and B. Purdy (Florida) ANALYSIS OF FILM FORMATION ON OBSIDIANS AND TEKITES. Understanding film formations on obsidians is important since they are used for dating artifacts. Surface reactions of three obsidians and one tektite were evaluated in three solutions: deionized water, simulated silicate ground water and a brine solution. Solution concentrations, pH and mass loss were measured as a function of time under controlled exposure conditions. Additionally, the surfaces of the samples were analyzed with fourier transform infrared reflection spectrography, AUGER electron spectrography coupled with Ar-ion milling and scanning electron microscopy. Preliminary results of solution and surface analyses suggest that film formation is more complex than can be explained with a simple hydration reaction. (24)

Kaiser, Timothy (UC-Berkeley) IMPLICATIONS OF CHANGING PATTERNS OF CERAMIC PRODUCTION IN THE BALKAN NEOLITHIC. Changes in patterns of ceramic production at several sites in Yugoslavia and Romania are examined in terms of the ways in which labor and resources are combined. By the late Neolithic, ceramic production was intensified, with every stage in the production process routinely involving a wider range and greater amount of both resources and labor. Increased and more focused production lead to conclusions concerning the reorganization of the social relations of production. (38)

Kane, Allen E., Janet D. Orcutt (Dolores Archaeological Program) and Timothy A. Kohler (Washington State) DOLORES ARCHAEOLOGICAL PROGRAM APPROACHES TO PALEODEMOGRAPHIC RECONSTRUCTIONS. Prehistoric momentary population densities and spatial and temporal fluctuations in population levels are central concerns of the Dolores Archaeological Program in its continuing mitigation effort. The program has adopted three approaches in estimating absolute population numbers. These are habitation or volumetric studies, resource limit or carrying capacity approaches and time/rate of deposition studies. The approaches are viewed as complementary, with each contributing to the overall reconstruction. The program is approaching demographic process by constructing a cultural model with attendant hypotheses and test implications. Formulation and testing of the model is currently under way. (25)

Kane, Allen E. (see Eighmy, Jeffrey L.) (47)

Kavanagh, Maureen (see Price T. Douglas) (22)

Kay, Marvin (Arkansas) and Russell W. Graham (Illinois State Museum) CLOVIS ADAPTATIONS IN THE MIDWEST: THE PROSPECTS FROM KIMMSWICK, EASTERN MISSOURI. The tangible evidence of big game hunting is but one aspect of Clovis adaptations within the central Mississippi River valley, where our excavations document the first Clovis/mastodon (*Mammot americanum*) association. The Kimmswick data indicate that Clovis groups had adapted to a variety of North American late Pleistocene environments which, in the Midwest, included open deciduous forests. The Clovis faunas demonstrate probable consumption of *Mammot*, a range of smaller mammalian herbivores, possibly reptiles and fish. Clovis chipped-stone tool use, manufacture and maintenance tasks are evidence for Kimmswick, a key Clovis site in eastern North America. (53)

Keel, Bennie C. and Victor A. Carbone (National Park Service) NATIONAL ARCHAEOLOGICAL RESEARCH TOPICS AND DATA RECOVERY PROGRAMS. Federal managers faced with budget reductions, with an inflationary economy and criticism of the Federal archaeological program by the General Accounting Office are seeking more economical and responsible ways to plan and implement their archaeological programs. The Tennessee-Tombigbee Waterway and Richard B. Russell projects, conceived and developed by Interagency Archeological Services and the Corps of Engineers, are critically examined using National Archaeological Research Topics concepts. Comparisons between NARTS and Agency legal requirements suggest that the use of NARTS is a beneficial approach but present compliance requirements inhibit their maximum usefulness. (33)

Keel, Bennie C. (see Nielson, J. Jerry) (14)

Keene, Arthur S. (see Wobst, H. Martin) (31)

Kelley, Jane (see Hanen, Marsha) (31)

Kelly, John E. (Illinois) THE RANGE SITE: IMPLICATIONS FOR EMERGENCE OF MISSISSIPPIAN CULTURE IN THE AMERICAN BOTTOM. Mississippian Culture represents the highest level of

sociocultural evolution in the Eastern United States. The source for Mississippian culture lies in the preceding Late Woodland and coeval cultures throughout the lower and central Mississippi Valley. Investigations at the Range site have resulted in the delineation of a sequence of Late Woodland/Mississippian communities. These communities serve as a basis for studying the evolution of Mississippian culture in the American Bottom; and contribute toward the development of models necessary for understanding Cahokia's development. Changes in various aspects of community plans and subsistence patterns through time will provide the means for formulating these models. (11)

Kelly, Lucretia S. and Paula Cross (Illinois) ANIMAL EXPLOITATION IN THE AMERICAN BOTTOM. While large quantities of animal bones have been identified from sites in the American Bottom, and in particular Cahokia, little work has been done to gain an understanding of faunal exploitation by aboriginal populations for the area. The data from current research being conducted on the FAI-270 sites will significantly aid in developing a model for faunal subsistence for the area, especially for the Late Woodland and Mississippian Cultures. These data will be presented and discussed. (11)

Kennedy, Douglas (see Perry, Leslie) (16)

Kent, Jonathan D. (Washington-St. Louis) OSTEON POPULATION DENSITY AND AGE IN SOUTH AMERICAN CAMELIDS. Although archaeologists have traditionally used macroscopic means for assessing age at death of faunal specimens, there is a wealth of little used microscopic techniques for this purpose. One of the most widely accepted aging techniques for human skeletal remains involves determining the relationship between age and osteon population density. It is argued that this technique may be successfully applied to nonhuman faunal remains. The application of this aging technique to South American camelids is described and various applications for this new faunal analytical technique are discussed. Finally, implications of possible differences between high and low altitude animals are explored. (46)

Kent, Susan (New Mexico) TWO DATA SETS ARE BETTER THAN ONE—A CASE STUDY OF THE USE OF ETHNOGRAPHY IN AN ATTEMPT TO UNDERSTAND ARCHAEOLOGICAL DATA. The use of ethnographic/ethnoarchaeological data is shown to be valuable in understanding the differences between the Navajo use of hogan space and space elsewhere, including inside the ramada where activities similar to those conducted inside the hogan are performed. The use of ethnographic data enables the archaeologist employing the direct historical approach to obtain information on symbolic behavior that otherwise would be impossible to ascertain. In addition, it is suggested that, with the appropriate methodology, such information may be obtainable even when it is not possible to use the direct historical approach. (4)

Kenton, Sannie L. (Corps of Engineers) KNIGHTS FERRY: EVOLUTION AND FUTURE OF AN EARLY CALIFORNIA INDUSTRIAL COMPLEX. The sandstone and brick ruins visible today at the eastern end of Knights Ferry were once part of a thriving rural industrial complex commencing during the California Gold Rush and surviving into the 20th Century. This complex is now included within 170 acres of government lands being developed for public recreational use. A brief historical evolution of this unique complex, its potential for interpretive and recreational enjoyment and the pros and cons of adaptive reuse and/or stabilization are presented. (29)

Kern, John R. (Commonwealth Associates) SOCIAL CHANGE: THE RISE AND FALL OF TENANCY IN THE COTTON SOUTH. Significant social change occurs in the Cotton South after the Civil War. Antebellum plantation gang labor housed centrally in slave quarters is replaced by freedmen labor provided by family units who live and work on small parcels of land as tenants. From 1870 to World War II, forty acres and a mule and shares characterize land use and economic exchange in the Cotton South. The mid-20th century demise of the system is occasioned by external sources of credit and wage labor and by agricultural mechanization. Archival sources, oral history and material culture investigations are integrated to study this social change. (33)

King, Thomas F. (Advisory Cncl. Historic Preservation) THE ONCE AND FUTURE DROUGHT: CLIMATE CHANGE AS A NATIONAL ARCHAEOLOGICAL RESEARCH TOPIC. We know that climatic changes have occurred during the Holocene, but we lack detailed knowledge about their magnitude and their effects on particular areas. We also lack information on their periodicity and predictability. These data are crucial to modern water resource and land use planning. Archaeology can provide valuable insights, because of the widespread nature of archaeological resources and because they place environmental change in a human context. West coast data suggest that the climate has shifted in a cyclic pattern since the Altithermal, and that a period of depressed precipitation may now be beginning. Data from the northern Plains and the Southwest present a somewhat different picture. The data are outlined and the steps needed to make archaeological data relevant to long range weather forecasting and environmental planning are discussed. (33)

Kintigh, Keith (Arizona) MEASURING ARCHAEOLOGICAL DIVERSITY WITHOUT PAIN. A method for the measurement of diversity is proposed. This method relies on a model which uses an archaeologically derived underlying frequency distribution of classes of artifacts to generate theoretical expectations for the number of different classes of items which should be found in a collection of a given total size. Because sample size is controlled for, collections of different sizes can be directly compared in a simple graphical display. Because of its rigor and simplicity, this method serves to focus interpretive attention on issues of anthropological importance. Significant examples from the archaeological literature are used to illustrate the operation and potential applicability of this method to a wide range of archaeological problems. (8)

Kisselburg, JoAnn E. (Arizona State) REEXAMINING THE VARIABILITY IN CERAMIC DESIGN. Ceramic typology has been a useful tool in roughing out the chronology of prehistoric societies. As our data base increases, however, we find that typologies become less useful. Several recently excavated Hohokam sites provide ceramic assemblages that are not easily assigned to chronological phases in terms of the traditional typology devised by Haury. Assigning transitional status to these assemblages cannot account for all the variation. This paper suggests some methods of examining the dynamics of design variability to attempt to sort out which design variations may be due to atemporal factors such as production specialization, boundary markers and vessel use. (15)

Klein, Richard G. (Chicago) CULTURAL EVOLUTION DURING THE MIDDLE AND LATER STONE AGE IN SOUTHERN AFRICA. Later Stone Age (LSA) Peoples, succeeding Middle Stone Age (MSA) ones 40-30,000 BP in southern Africa, not only made very different kinds of artifacts than their predecessors, but appear to have exploited animal resources more efficiently and intensively. Faunal assemblages from a series of MSA and LSA sites suggest that only LSA people routinely caught fish and fowl, that they were much better equipped to capture relatively dangerous terrestrial prey and that they cropped small mammals, tortoises and shellfish at a much higher rate than their MSA predecessors. Combined artifactual and faunal data indicate that the LSA represented a kind of quantum advance over the MSA in southern Africa. (6)

Knight, George C. (Washington-St. Louis) ETHNOARCHAEOLOGY: ARCHAEOLOGY IN THE CONTEXT OF DISCOVERY. The paper briefly describes the historical development of ethnoarchaeology as it is currently expressed, and examines the philosophy of current ethnoarchaeology. In examining the history of ethnoarchaeology, it is found that prevailing concepts of culture have strongly conditioned the way in which ethnoarchaeology has been done or discussed. It is possible to expose fallacies in the notion of analogy commonly espoused by (ethno-) archaeologists (without relying on Gould's, Binford's or Schiffer's dismissals of the term), and finally to expand and reformulate Schiffer's contention that ethnoarchaeology, to be properly explanatory, must be a law-seeking endeavor. (12)

Knobloch, Patricia J. (Binghamton) CERAMIC STYLE AND CHRONOLOGY AT HUARI, PERU. Ceramics indicating occupation from AD 300 to AD 650 were collected at Huari, Peru, from stratified refuse deposits. In the 1960s, Dorothy Menzel established a seriation chronology of ceramic styles for this area and time. Analysis of the stratified materials supports her chronology. In addition, other patterns of progressive stylistic change were discovered. These patterns reveal the beginnings of stylistic innovations as well as the integration or culmination of other attributes. As a result, the temporal changes in the ceramic styles can be defined more explicitly. These patterns of change are important for interpreting the culture history of the Huari site and its relationship to other Middle Horizon centers. (46)

Kohler, Timothy A. (see Kane, Allen E.) (25)

Kolb, Charles C. and David J. Grettler (Behrend-Penn. State) THE W.P.A. ERIE COUNTY, PENNSYLVANIA ARCHAEOLOGICAL SURVEY, 1936-1937: "RECONSTRUCTION" AND ANALYSIS. Artifacts from the Erie (PA) Historical Museum obtained during Works Progress Administration research in 1936-1937 and never studied or published are reported. This collection is the largest in the public domain from Erie County, but lacked supportive field notes and other "paper" records. Ethnohistoric and ethnographic techniques were employed to "reconstruct" the original field and laboratory research in order to interpret the methods of the 1930s and pre-World War II political climate. Current research produced data on unreported sites, expanded known relative chronologies, provided regional comparative data and yielded information relevant to the Erie Indians. The study illustrates the use of extant museum collections as a data base during this time of budgetary retrenchment. (55)

Kosakowsky, Laura J. (Arizona) and Fred Valdez, Jr. (Harvard) RETHINKING THE NORTHERN BELIZE FORMATIVE CERAMIC CHRONOLOGY. Recent archaeological excavations at the sites of Cuello and Colha in Northern Belize suggest a new ceramic chronology for the Formative

Period. Early Swasey pottery, first found at the site of Cuello, has now been found at a number of sites including Colha. The Swasey Phase, possibly as old as 2250 BC, is now thought to be followed by a ceramic phase closely tied to the early Xe pottery at Altar de Sacrificios in Guatemala and beginning perhaps as early as 1400 BC. Further ceramic analyses and radiocarbon dating will permit a necessary refinement in the previously developed ceramic chronology for this region. (51)

Kosakowsky, Laura J. (see Valdez, Fred, Jr.) (3)

Kraft, John C. (Delaware) MARINE ENVIRONMENTS/LITTORAL REGIONS. The dynamics of coastal change, as related to archaeology, are highly varied and dependent upon the type of coastal zone being studied. Cliff-type coasts are usually tectonically controlled and undergoing retreat. This causes archaeological sites to be destroyed. In this case the most important data of coastal reconstruction is the geological analysis of the rate of cliff erosion and the nature of the sediment or rock undergoing erosion. On the other hand, depositional-type shorelines associated with river floodplains, deltas or lagoon barrier beaches must be approached from a completely different point of view. Subsurface drill-hole evidence is needed to determine the three dimensional shape of the sedimentary bodies and radiocarbon dates are needed to put the shorelines and sedimentary bodies into a time frame. (50)

Kunz, Michael L. (Northwestern Alaskan Pipeline Co.) THE MESA: AN EARLY HOLOCENE ARCHAEOLOGICAL SITE IN NORTHERN ALASKA. The Mesa Site, a hunting station/lookout located in the Etivluk River drainage, represents a previously unknown complex from northcentral Alaska. A date of 7620 radiocarbon years BP was obtained from the combined charcoal of three hearths; found in association were stylistically identical lanceolate projectile points. Extensive survey, testing and limited excavation indicates a single cultural component, supported by pedological and palynological studies. The dating of this site is of particular interest as it represents a poorly represented time period in Northern Alaska. (28)

Kvamme, Kenneth L. (UCSB) METHODS FOR ANALYZING AND UNDERSTANDING HUNTER-GATHERER SITE LOCATION AS A FUNCTION OF ENVIRONMENTAL VARIABILITY. Environmental measurements obtained at hunter-gatherer site locations in western Colorado are statistically compared with identical measurements performed at randomly chosen background settings. Features of the environment actually chosen by the prehistoric inhabitants in placing their sites are determined and a quantitative model is constructed which can accurately predict site locations. Ethnographic studies suggest that a narrowing process is applied to the environment in site placement decisions. Archaeological data indicate that more permanent sites occupy a more restrictive portion of the environment than do less permanent sites while the latter occupy only a small portion of the total environmental range. (37)

LaBianca, Oystein S. (Andrews) THE FOOD PRODUCTION SYSTEM OF MODERN AND ANCIENT HESBAN IN JORDAN. Ethnoarchaeological investigations in the vicinity of Hesban in Jordan have enhanced understanding of the interrelationship between climate, topography, settlement pattern, operational facilities, land use and diet as parameters of food production systems. These investigations have made possible the formulation of a model whereby patterning in archaeological and survey data from Hesban and vicinity can be accounted for. Patterns of transience, resilience and stability are discussed with respect to changes over time in the intensity of food production on the fields of Hesban. (9)

Lackey, Louana M. (American) NEGATIVE-PAINTED WARES: AN EXPERIMENTAL APPROACH. The term "negative-painting," as commonly used in the archaeological literature, denotes a wax-resist technique of decorating ceramics. The definition should be expanded to include paper, rubber, string, mud, fabric and several other materials used as masks for resist decoration. Although many of these were available prehistorically, their use for ceramic resist decoration is not known archaeologically. Forming and firing tests were conducted using these alternate masking techniques in order to determine observable differences in the finished wares. Both unfired and fired samples of these tests are presented. (Poster Session—Thursday)

Lacy, David M. and Robert J. Hasenstab (Massachusetts/Amherst) THE DEVELOPMENT OF LEAST EFFORT STRATEGIES IN CRM: COMPETITION FOR SCARCE RESOURCES IN MASSACHUSETTS. Archaeology has been diverted from its course of "pure" anthropological research in the wake of the ecological-conservation movement, first articulated in the 1960s and subsequently manifested as CRM. Our recent assessment of survey performance in Massachusetts provides an opportunity to indulge in some "informed speculation" about the dynamics associated with the maturation of CRM in the 1970s. In particular, this paper focuses on fundamental aspects of survey reports—ostensibly a data base from which anthropology will benefit—and attempts to explain the observable trend toward systemic mediocrity in terms of political, economic and bureaucratic factors. (31)

Lacy, David M. (see Hasenstab, Robert J.) (40)

Laczko, Gina (Arizona State) MESA VERDE SETTLEMENT PATTERNS. Using survey data from the 3,892 sites identified at the Mesa Verde, this regional analysis examines the bimodal distribution of sites, their rank-size relationships and kiva/room ratios, especially in the Classic Period. Environmental data are also presented and the relationship of prime land to site distribution is discussed. Finally, a model is presented which suggests that the Anasazi at Mesa Verde were participating in a cooperative network and that the organization of these integrated units led to the development of a two-level hierarchical sociopolitical unit. (25)

Laczko, Gina (see Phinney, Chad T.) (15)

Lade, K.-Peter (Salisbury) THE MONITORING AND DETECTION OF ARCHAEOLOGICAL RESOURCES THROUGH THE USE OF LANDSAT DIGITIZED MULTISPECTRAL DATA. Digitized multispectral data from the Landsat satellites is available for most areas of the world. A continuous record, beginning in 1972, may be examined for temporal studies and should be of increasing value to archaeologists interested in regional designs and cultural resource management concerns. In this paper the theoretical assumptions underlying multispectral signature development are reviewed and then applied to archaeological investigations in Maryland. Conclusions are drawn concerning the future direction that archaeologists might pursue. Other satellite sensors currently being developed by NASA are also reviewed to determine future directions that research in digitized satellite data might take. (52)

Lanford, W. (Physics: SUNY-Albany) APPLICATION OF NUCLEAR REACTION ANALYSIS TO THE STUDY OF HYDRATION MECHANISMS AND TO DATING. Nuclear reaction analysis is capable of quantitatively measuring the concentration vs depth of hydrogen in any solid with depth resolution of order 50–100 Å. It can be applied to study the hydration of glasses, including obsidian, to learn both about the fundamental hydration mechanisms and about hydration rates. Under laboratory conditions, hydration is controlled by the interdiffusion of hydrogen ions (from water) with alkali ions in the glass. Also, by combining the measurement of the hydration rate (at ambient temperature) on an individual artifact with the historical hydration thickness, an intrinsic dating procedure can be developed. (24)

Lange, Frederick W. (Illinois State) and Charles R. Smith (Corps of Engineers, Rock Island District) HISTORIC SITES: MANAGING A DYNAMIC RESOURCE. Cultural resource management strategies for prehistoric and historic sites have common conservation goals for the future; however, the management challenges, although similar at first glance, they are really quite different. When the dynamic dimension of history is considered, the potential for historic sites is infinite, but the future role for archaeologists has not been considered. A continuing role for archaeologists is seen, especially in documenting the "inarticulate" segments of society, and the need for "anticipatory mitigation" is examined. (7)

Lange, Richard C. and Barbara A. Murphy (Arizona State Museum) SETTLEMENT IN THE SIERRA ANCHA. Cliff dwellings and pueblos in the Sierra Ancha of east central Arizona are revisited to rerecord and expand the available information on the sites. Detailed map making, architectural notes, extensive photography, and further tree-ring sampling constitute the focus of the new work at these sites. Advances in archaeological knowledge and techniques since the original work by Dr. Haury with Gila Pueblo make possible new insights into the building sequences within these sites and the relationships of these sites and their occupants to the regional population dynamics during the periods of population aggregation and dispersal. (25)

Large, Elinor G. (Arizona State) THE HOHOKAM-PIMA RELATIONSHIP: GAP OR CONTINUUM? It has been generally accepted that the Pima Indians of southern Arizona are the descendants of the prehistoric Hohokam. There is a 236-year gap between the disappearance of the Hohokam and the first recorded contact with the Pima. This gap is representative of a more widespread problem of linking ethnohistorically recorded groups with archaeological remains. The Gould-Eldredge model of punctuated equilibria is suggested as an explanation for this phenomenon and is applied to the Hohokam-Pima data. (15)

Larick, Roy R. and Jean-Philippe Rigaud (Binghamton) CHERT ACQUISITION AND USE AS INDICATORS OF PALEOLITHIC OCCUPATION TYPE AND LENGTH: EVIDENCE FROM LE FLAGEOLET. The near complete excavation of a single, small Upper Perigordian stratigraphic level from Le Flageolet I (Couche VII) reveals the use of cherts from at least 17 different geological sources. These sources are spread over an area of several thousand km² in the French Perigord. Site-source distances range to more than 80 km. Ways in which this information may be used to help estimate the kind and duration of activities at this and similar sites is discussed. Analytical assumptions of the contemporaneity of activities represented in minimal stratigraphic units in Paleolithic sites is challenged. (21)

Larick, Roy R. (see Simek, Jan F.) (8)

Larsen, Curtis E. (USGS) GEOARCHAEOLOGICAL INTERPRETATION OF LAKESHORE ENVIRONMENTS. Lakeshore settings were among the areas most commonly sought by prehistoric groups. The presence of waterfowl, fish and shellfish, not to mention the freshwater resource, led to concentrations of population in productive environments. Thus, the archaeological literature abounds with apparent relationships between sites and "strandlines," "raised terraces" and "beaches." Site stratigraphy includes "waterlain" sands covering or underlying archaeological components. Geologically, however, the definition of lacustrine and lakeshore environments is more complex. The use of coastal landforms and environments in the Great Lakes region is an example to aid archaeological interpretation. Common misconceptions of the data needed to recognize lake-related sites are discussed as are the types of data required to critically interpret and reconstruct lakeshore paleoenvironments. (50)

Lensink, Stephen C. (Iowa) POPULATION TRENDS FOR HOLOCENE FORAGERS: A CASE STUDY FROM THE PRAIRIE MARSHES OF THE MIDWESTERN U.S. The relative sizes of prehistoric populations in the prairie marsh region are estimated on the basis of projectile point data. Temporal changes in point popularity are modeled with a variety of distributions which are then summed to produce a population utilization curve for the Holocene. Regional trends indicate (1) a gradual increase in utilization of the area through the Middle Archaic, (2) a slight decline in the Late Archaic, (3) a dramatic increase during Woodland times and (4) a correspondingly large decrease in the Late Prehistoric. Correlation with climatic episodes appears to account for some of the observed trends. (23)

Leonard, A. Byron (Kansas) ECOLOGICAL AND CLIMATIC IMPLICATIONS OF FOSSIL MOLLUSKS AT THE LANGE/FERGUSON (39SH33) CLOVIS KILL SITE. More than 30 species of terrestrial and freshwater mollusks occur in the deposits associated with the bones of a butchered mammoth at the Lange/Ferguson site, Shannon County, South Dakota. Two-thirds of the species lived on the wooded, brushy or grassy slopes surrounding the site, while the remainder flourished in the water of a shallow lake in which the mammoth is presumed to have flourished. The absence of branchiate gastropods points to a lake of relative youthfulness. The climate was not significantly cooler than that which exists today, but it was obviously more humid. (34)

Lerner, Shereen and Rachel Most (Arizona State) AN ALTERNATIVE EXPLANATION FOR PAN-REGIONAL VARIATION: AN EXAMPLE FROM THE SOUTHWEST. Three prehistoric settlement systems in central Arizona are compared and contrasted in terms of their organizational structure. Previous work in these areas has turned to cultural affiliation as an explanation for inter-regional variability. We believe that this is not the only explanation. Specifically, we are concerned with the hierarchical nature of each area, locational considerations and activity differentiation. Analyses will be performed on an individual basis and on a panregional level. Our ultimate goal is to characterize the data from these three areas in central Arizona as an integrated regional social and economic system. (25)

Lewarch, Dennis E. (South Carolina) CONSERVATION AND EXPLOITATION IN MESOAMERICAN ARCHAEOLOGY: AN ASSESSMENT. The conservation ethic increasingly conditions all archaeological research in the United States and other countries. Examination of publications, reports, and papers of United States archaeologists working in Mexico, however, indicates that the conservation ethic is not widely applied. Reorientation of research strategies away from a viewpoint emphasizing exploitation of the resource base to one founded in a conservation model is suggested. Examples drawn from cultural resource management research are presented to indicate the reorganization required to more closely conform to changing discipline-wide standards as well as Mexican laws dealing with the national patrimony. (48)

Lewis, Barry (Illinois) ARCHAEOLOGICAL SITE DISTRIBUTIONS ON THE MISSISSIPPI GULF COAST. The Mississippi Gulf Coast is an archaeologically important but little known region. Recent research has drawn together site record information available for the coastal counties and supplemented it with new survey data from the western part of the region. The analysis of those data reveals important spatial and temporal patterns in the prehistoric use of the tidal marsh and adjacent landforms. These patterns include the stability of late prehistoric site location choices, spatial distributions in relation to major plant communities and landforms and site record biases due to subsidence, survey type and site visibility. (10)

Lewthwaite, J. G. (Cambridge) THE TRANSITION TO FOOD PRODUCTION IN PREHISTORIC EUROPE. The problem addressed is that of the inevitability or contingency of the extension of the west Asiatic mode of village farming with its associated plant/animal complexes across Europe. This is viewed with respect to the intensified exploitation of indigenous resources and the mid-Holocene climatic optimum occurring at the time. The solution proposed recognizes the balance

between determinacy at a global scale and the uniqueness of geographic location and prior historical development. The author suspects that were the barriers to the extension of the west Asiatic mode more robust, the European Mesolithic communities would conform in later prehistory to the pattern of (Jomon) Japan and (Woodland) North America in pursuing the development of local resources to such a degree that sedentary ceramic-using communities without mixed farming would have resulted. (2)

Lindauer, Owen (Arizona State) A "BEHAVIORAL" APPROACH TO ARTIFACT SCATTERS. In spite of stimulating research on Hohokam chronology, regional interaction and general processual issues, problems still remain in interpreting basic information sources such as artifact scatters. Proponents of Schiffer's "behavioral" approach have defined issues relating to these problems but have failed to operationalize them adequately. Alternative strategies are offered in studying the relations of surface to subsurface remains at a Hohokam site. An interpretive model that uses information on the degree of ceramic breakage and conjoinability is proposed that operationalizes several concepts of site formation and transformation. The information potential of sherd and lithic scatters is then discussed and the contribution their study may make is evaluated. (15)

Lippi, Ronald D. (Wisconsin) A NEW MACHALILLA CERAMIC SEQUENCE. Excavations at two south coastal Ecuadorian sites have provided ceramic data used in constructing a new chronology for the Machalilla phase. Three previously proposed sequences are briefly critiqued before presenting the new sequence. A detailed similarity seriation principally of vessel form, engraving and red-painting establishes the sequence, and similarities or transitional features with Valdivia and Engoroy/Chorrera are discussed. New and previously available radiocarbon dates are considered and it is suggested that the Machalilla phase was of shorter duration and slightly more recent than is generally acknowledged. (30)

Lischka, Joseph J. (Colorado) PREHISTORIC MARITIME ADAPTATIONS ON THE PERUVIAN COAST. It has been suggested recently that marine productivity along the Peruvian coast was too low to support rapid population increase and the beginnings of sociocultural complexity during the Cotton Pre-ceramic (ca. 2600-1800 BC). Low marine productivity is attributed partly to disruptions of the marine ecosystem by periodic *niños*. Increased rainfall accompanying severe *niños*, however, temporarily increases the productivity of flood plain agriculture and natural terrestrial ecosystems, suggesting that coastal populations temporarily shifted subsistence strategies and returned to a maritime orientation when the marine ecosystem returned to normal. (10)

London, Gloria A. (Arizona) ETHNOARCHAEOLOGY OF FULL-TIME POTTERY SPECIALISTS IN PARADIJON, SOUTHEASTERN LUZON, THE PHILIPPINES. In Paradijon, potters fashion flower pots, stoves, cooking pots and jars using coils and the paddle and anvil technique. The organization of the industry is studied, including who supplies clay to whom, and which potters work, fire and sell together. Criteria potters use to identify the work of individuals is noted. Sources of variability in the work of individuals is examined. The hypothesis that standardization results from the work of specialists typical of stratified societies and the rise of civilizations is tested. (12)

Long, Austin (see Willis, Wirt) (25)

Longacre, William A. (Arizona) POTTERY USE-LIFE IN A KALINGA VILLAGE, NORTHERN LUZON, THE PHILIPPINES. Virtually all estimates of the use-life of ceramic containers in use among living societies are based upon interview data. During 1976, all pots in use in the Kalinga Village of Dangtalan, northern Luzon, the Philippines, were recorded and "tagged." In 1979, a second census of pottery was taken in the same village. Accurate estimates of ceramic use-life, based upon a sample of more than 1,100 pots, are now possible. Data on various types and sizes of pots suggest some generalizations and changed frequencies in the ceramic assemblage are clearly reflective of changed economic factors. (12)

Lopinot, Neal H. (see Butler, Brian M.) (49)

Lord, K. (Esca-Tech.) INVERTEBRATE FAUNAL REMAINS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. A large number of terrestrial gastropods (land snails) and naiads (freshwater mussels) were recovered during the excavations at Meadowcroft Rockshelter (36WH297). Land snails are of particular importance in attempts to reconstruct paleoenvironmental conditions at and near the site because of their habitat requirements. Freshwater mussels also reflect environmental parameters. However, their presence at Meadowcroft is due to human selection and transport. Consequently, mussels also monitor cultural variables. It appears that mussels present in the Meadowcroft assemblage have both local and more distant origins. The place of the data from the invertebrate fauna in the larger reconstruction of paleoenvironment in the Cross Creek drainage and specifically at Meadowcroft Rockshelter itself is discussed. (45)

Lothrop, Jonathan C. (SUNY-Binghamton) *PIÈCES ESQUILLÉES FROM THE VAIL SITE: TECHNO-FUNCTIONAL IMPLICATIONS FOR PALEOINDIAN STUDIES*. *Pièces esquillées* were first observed in Old World assemblages 75 years ago, and archaeologists there have widely acknowledged the bone-wedging function ascribed to them. These tools are often present in Paleoindian site assemblages in North America, but in most cases either have escaped recognition or have been misdiagnosed as exhausted cores. The Vail Paleoindian site in Oxford County, northwestern Maine, has produced a sample of several hundred *pièces esquillées*, thereby enabling intensive study of this oft-neglected tool class. Attribute and metric analyses are presented which substantiate arguments for a bone-wedging function of these tools. (35)

Lothrop, Joy Mahler *TEXTILES FROM THE CENOTE OF SACRIFICE AT CHICHÉN ITZÁ*. The late Edward H. Thompson dredged the Cenote between 1904 and 1907 and among other treasures, he salvaged over 700 textile fragments. Each piece was analyzed as to nature of the yarn, spinning direction, warp weft counts and classified as to structure, weaving techniques and designs. Though the bulk of the fragments are unadorned plain weaves, there is ample evidence to claim a highly skilled textile tradition existed in this late period. Some historical background, questions concerning the original state of the cloth and some comparative material are also offered. (17)

Lubensky, Earl H. (Missouri) *THE HUANCAVILCAS IN THE GUAYAS BASIN*. The Huancavilca, according to Spanish conquerors, inhabited the area around Guayaquil and the southern Guayas area at the time of contact. Their exact location and their relationship with other peoples in the area has not been clear, and even the name assigned to them has been a source of confusion. Excavation of an Integration Period cemetery on the Hacienda Ayala in the Guayas delta region may shed some light on the mixture of cultural phases in this overlapping boundary area between what is called the Milagro-Quevedo phase on the east and the Huancavilca, Manteño or Southern Manteño on the west. (30)

Lurie, Rochelle (Northwestern) *MEASURING EFFICIENCY IN THE USE OF LITHIC MATERIALS*. Time and energy invested in stone tool manufacture are not simply products of evolution or of increasing technological knowhow, but are responses to the nature and availability of resources, and competition for these resources. A shift in hunter-gatherer mobility patterns at the Koster Site suggests a change in resource utilization which may have required increased efficiency in tool manufacture and use. The diversity and standardization of tools, the ratio of shaped tools to utilized flakes and cobbles and the specialized use of expensive raw material are used to monitor possible change. (13)

Lurie, Rochelle (see Sasso, Robert F.) (39)

Lynott, Mark J. (National Park Service) *WOODLAND PERIOD ADAPTIVE PATTERNS IN NORTHERN MINNESOTA*. Two seasons of archaeological survey and site testing in Voyageurs National Park have provided evidence pertaining to Middle and Late Woodland adaptation in the northern lake country. The sites are located on the margins of large lakes and appear to represent intermittent occupations of varying duration. Based upon thermoluminescence dating of ceramics, the area appears to have been intensively occupied for the last 2,000 years. Palynological study of lake sediment cores have produced a record of changing vegetation that corresponds to this period and documents a trend toward cooler conditions during the period from 550 BP to 100 BP. Subsistence patterns reflected in vertebrate faunal remains are oriented toward exploitation of birds, fish, reptiles and mammals. Identification of fossil phytoliths provides evidence of wild rice exploitation. The regional settlement system seems to reflect mobile populations involved in a seasonally oriented pattern of aggregation and dispersal. (16)

MacNeish, Richard S. (Peabody Foundation) *NORTHERN BELIZE PRECERAMIC*. This is an introductory statement about the preceramic of Northern Belize on the basis of a season's survey (1980) and two small excavations (1981). Even though work is still progressing as of now (1982) six preceramic sites are being excavated. We already have the outlines of cultural sequences of five complexes from roughly 9000 to 2000 BC. This sequence sees a shift from inland hunters to Archaic inland collectors on to the Melinda complex with a maritime orientation and finally to the Progreso complex that seems maritime and riverine adapted. The latter seems ancestral to the Maya phases with ceramics. (3)

Magennis, Ann L. and Debra L. Martin (Massachusetts) *MICROSCOPIC TECHNIQUES FOR OSSUARY ANALYSIS: AN EXAMPLE FROM CAPE COD, MASSACHUSETTS*. Analysis of skeletal remains from ossuary burials presents special problems for bioarchaeologists. Visual methods for assessment of population characteristics such as age and sex, disease and nutritional status often yield frustratingly incomplete information. The utility of microscopic aging techniques for ossuary samples has been demonstrated. Moreover, a recent study has shown that histological analysis of thinsections can also be a valuable means of segregating individuals. Both macro-

and microscopic methods of aging and separation of individuals were used in the study of a Woodland period ossuary from Cape Cod, Massachusetts. Results demonstrate the utility of microscopic analysis for gaining information beyond that which is traditionally obtained from macroscopic analysis alone. (22)

Malpas, Michael A. (Wisconsin) *PRECERAMIC SUBSISTENCE TECHNOLOGIES ALONG THE NORTH CENTRAL COAST OF PERU*. Recent fieldwork by the author at preceramic sites near a large *loma* formation south of the Casma valley has yielded detailed information concerning the lithic artifacts used for the exploitation of this unique resource zone. A lack of tools normally associated with terrestrial hunting, combined with the presence of grinding stones and other tools generally considered to be for plant processing, suggests an orientation principally toward the flora rather than fauna of the loma. The assemblages are very similar to those from preceramic sites farther south, but very different from reported highland sites, suggesting closer cultural affinities with the former. (46)

Marks, Anthony E. and Harold Hietala (Southern Methodist) *FROM MIDDLE TO UPPER PALEOLITHIC IN THE SOUTHERN LEVANT: BEHAVIORAL INFERENCES*. Recent work in the Central Negev, Israel, suggests a model reflecting profound behavioral shifts for a Middle to Upper Paleolithic transition. The major changes are from a radiating to a circulating settlement pattern. Particular attention is paid to intrasite variability during the crucial period of the transition, dated at Boker Tachtit to ca. 45,000 BC. The spatial data suggest a shift from activity specific loci in the earliest occupation to generalized activity loci in the latest occupation. (6)

Marquardt, William H. (South Carolina) *ADVANCING THE UNDERSTANDING OF LATE PLEISTOCENE/HOLOCENE SOCIETIES*. With a broader understanding of ecology, some informative data from living societies, and an appreciation for the dynamism and complexity of their sites, archaeologists are closer than ever before to an understanding of Late Pleistocene/Holocene hunter-gatherers. Advances in understanding the "Archaic" and the "Mesolithic" are reviewed critically, considering theory and method as well as factual knowledge. It is suggested that inadequate explanations may result if consideration is not given to the built-in biases of some of our models. Some reorientations are suggested, and a plea is made for a broader perspective and more critical discourse between Americans and Europeans. (2)

Martin, Debra L., Alan C. Swedlund and George J. Armelagos (Massachusetts) *POPULATION DYNAMICS, RESOURCES AND SKELETAL BIOLOGY ON BLACK MESA*. The causes and effects of population change on Black Mesa, Arizona (700-1150 AD) have yet to be fully understood. In order to assess the importance of any one variable on population dynamics, an integrative framework utilizing skeletal analysis is proposed. This paper defines how skeletal biology can articulate with archaeological reconstruction in the interpretation of environmental, nutritional and disease processes, and of population responses to stress. The existence of age- and sex-related stress indicators, as well as the presence of differential frequencies through time have been demonstrated. The occurrence of enamel defects, growth arrest lines, porotic hyperostosis, major trace element deficiencies and increased rates of bone turnover suggest that stressors of a seasonal nature were present, and that these stressors amplified through time, with the greatest severity and biological involvement occurring at the time of abandonment. These interpretations, combined with the data from floral and faunal analysis and the environmental reconstruction, will increase the ability of bioarchaeologists to test the hypothesis of population change. (44)

Martin, Debra L. (see Magennis, Ann L.) (22)

Martin, James E. (South Dakota School of Mines and Technology) *VERTEBRATE FOSSILS FROM THE LANGE/FERGUSON (39SH33) CLOVIS KILL SITE*. This fossiliferous locality contains an intermixed, localized concentration of both large and small bones. Larger taxa include at least two individuals of *Mammuthus columbi*, *Bison* and ?*cervid*. Elements of these taxa appear to have been butchered although the larger elephant remains partially articulated, and articulation of the limbs indicates this mammoth may have been mired. Smaller taxa include anurans, turtles, snakes, birds, insectivores, rabbits, gophers, cricetids, zapodids, muskrat and microtines. The microtines and anurans are the most abundant taxa, and many specimens consist of articulated or associated skeletons. Almost all of these taxa, their preservation and the enclosing sediment indicate a community proximal to quiet water. (34)

Martin, Larry D. (Kansas) *THE EFFECT OF THE END OF THE PLEISTOCENE ON MAN IN THE NEW WORLD*. The climatic change at the end of the Pleistocene in North America culminated with the disruption and extinction of the late Pleistocene communities. The total diversity of plants and animals was reduced in all areas. These changes were the result of the development of a more seasonal climate, and must have forced hunting and gathering activities to become more restricted. A seasonal climate with hot and possibly arid summers and cold winters would

require an increase in the ability to preserve and store food or water and/or an increase in seasonal mobility. (19)

Martin, Paul S. and Robert S. Thompson (Arizona) GROUND SLOTH EXTINCTION AND THE BLITZKRIEG MODEL. The Shasta ground sloth (*Nothrotherops*) was the smallest of the extinct North American genera. In the Pleistocene it ranged from Florida to Oregon. Its distinctive dry dung balls have been found between 350 and 2000m elevation in eight southwestern caves. Diet analysis indicates little or no grass and a variety of browse, especially *Malyaceae* and *Ephdra*. The youngest of 16 radiocarbon dates younger than 11.5 ka fall within two ^{14}C standard deviations of 11 ka, the time of Clovis mammoth hunters. Rate of dung deposition and diet prior to extinction does not suggest a population in natural decline or suffering obvious stress. (19)

Mayer-Oakes, William J. (Texas Tech) SCHOLARS AND THE DISCIPLINE—A STRUCTURAL APPROACH TO ARCHAEOLOGICAL RESEARCH VARIETY AND ITS DEVELOPMENT. The archaeological discipline is now at an early stage of maturity. It has achieved a new level of interdisciplinary team capability. Using eight variables derived from the core concepts "discipline" and "scholar," a structural analysis is presented to explain the new status. Accepting this view leads to a new perspective on the evolution of U.S. archaeology. Presented schematically, this perspective suggests parallels between public and academic archaeology as well as parallels to the evolution of another American social phenomenon. Jazz history is used comparatively to briefly consider the role of "schools" and "individuals" in the development of U.S. archaeology. (7)

McCarthy, John P. (Temple) EXAMINING SOCIOCULTURAL VARIATION: AN APPROACH TO THE ARCHAEOLOGY OF URBAN AMERICA. In the past, urban archaeology has been defined as the study of changes to the morphology of the city. More recent work has turned toward the examination of urban society. In this paper the author presents an approach to the investigation of sociocultural variation through the study of the urban archaeological record. It is suggested that historical documentation can be used to link variation in the archaeological record to social, cultural and functional variations in the archaeological record across time and space. The result is a firmer understanding of particular sociocultural phenomena and the effects of such phenomena on the archaeological record. (32)

McCartney, Allen P. (Arkansas) REEVALUATION OF METAL USE BY THULE ESKIMOS OF THE CANADIAN ARCTIC. Iron and copper in low frequency are common to classic Thule winter camp sites of the Canadian Arctic. These infrequently traded pieces suggest that metal had little significance to manufacturing or subsistence activities. However, direct and indirect evidence of manufacturing found at Thule sites strongly imply that metal was used extensively as graving tool blades which replaced earlier Dorset and Pre-Dorset stone burin blades. Metal curation was primarily responsible for limited presence at sites. The expansion of Thule Eskimos from Alaska must be viewed as a new manufacturing, as well as a new subsistence, adaptation to the central Arctic. (27)

McDougle, Eugene J. (Museo, Banco Central, Ecuador) FURTHER STUDIES OF THE PREHISTORIC WATER MANAGEMENT SYSTEM OF SOUTHWEST ECUADOR. Recent extensive excavation of one of the largest of a series of more than 100 prehistoric earthen catch basins located in the semi-arid zone of the Santa Elena Peninsula in southwest Ecuador validates a method of dating the construction and use of these structures, which were a system of managing and conserving fresh water. Present evidence suggests that the basins became progressively smaller and more numerous, their location shifting from La Libertad west to the Santa Rosa area. A concomitant and repeated shift possibly reflects environmental modulations and/or evolutionary change in aboriginal society after about 500 BC. (30)

McElrath, Dale L. (Illinois) CULTURE HISTORY OF THE AMERICAN BOTTOM AS SEEN FROM THE ADJACENT UPLANDS. The excavation of extensive barrow pit areas in conjunction with the construction of FAI-270 has made available information from a large number of prehistoric sites dating between 2700 BC and 1100 AC. The information derived from these sites is briefly presented, and implications for our understanding of American Bottom prehistory is explored. Particular attention is given to the changing nature of prehistoric settlement through time in the American Bottom area and how these changes fit into the larger regional prehistory. (11)

McEwan, Colin (Illinois, Urbana) SEATS OF POWER: SOCIOCULTURAL EVOLUTION AT AGUA BLANCA, MANABI. Agua Blanca, a major Manteño center, lies in the valley of the Rio Buena Vista on the central coast of Manabi, Ecuador. Its ecological setting is described and the results of a valley-wide survey (1979) and topographic mapping of the site's central zone (1981) are presented. These reveal a continuous sequence of occupation from the Early Formative onward, with an extensive use of stone architecture in the late Precolumbian period. The trajectory of the internal

sociocultural evolutionary processes involved is outlined, culminating in a detailed discussion of the distribution of stone seats in relation to the site infrastructure of the Manteño component. (30)

McGuire, Randall H. and Robert S. Sternberg (Arizona) A REVISION OF THE VIRTUAL GEOMAGNETIC POLE CURVE FOR THE U.S. SOUTHWEST (AD 1100-1400) AND ITS IMPLICATIONS FOR ARCHAEOMAGNETIC DATING. Over 158 archaeomagnetic samples have been collected from 73 sites in the U.S. Southwest. Seventy-three features are independently dated by tree-ring, C-14 and ceramic dates between AD 700-1450, with the densest data between AD 1100-1400. A VGP was constructed by computing weighted average directions and percisions within a moving window. The results are generally similar to Dubois' (1975) VGP curve but our curve is smoother and it runs about 100 years ahead of Dubois' from AD 900-1200. This would correct the surprisingly late archaeomagnetic dates determined on the basis of Dubois' curve for the abandonment of Chaco Canyon and the Sacaton phase of the Hohokam Root. (47)

McGuire, Randall H. (see Schiffer, Michael B.) (4)

McKenna, Jeanette A. (Arizona State) ACCULTURATION PROCESSES AS REFLECTED IN PIMAN HOUSEHOLD PATTERNS. Between the mid-19th century and early 20th century a number of changes occurred in the lifestyle of the Piman Indians of Arizona. Two major factors responsible for this were the political intervention of the government and the increasing involvement in the Anglo cash economy. These acculturative changes are reflected in the organization of the Piman household complex and can be traced through archaeological and ethnographic research techniques. They are seen in the gradual constriction of the physical complex size, in the increasing emphasis on indoor rather than outdoor living and in the rearrangement of traditional facilities to accommodate newly acquired activities. (26)

McManamon, Francis P. (National Park Service) SITE DISCOVERY TECHNIQUES IN AREAS OF DENSE GROUND COVER. Surface inspection during pedestrian survey, the traditional technique of site discovery in lightly vegetated and heavily cultivated portions of the world, is not an effective technique in areas of dense ground cover. Chemical tests, resistivity tests, magnetometry and remote sensing have been suggested as site discovery techniques. Subsurface tests with a wide range of shapes and volumes have been used as site discovery techniques. Some of these techniques, notably larger-sized test pits, are effective discovery of all but very small archaeological sites. This seems to be so because they are large enough to encompass diffusely distributed artifacts or artifact clusters within site areas. (47)

McMillan, R. Bruce (Ill. St. Museum) PRESERVATION OF COLLECTIONS: A VIEW FROM THE MUSEUM. The importance of systematic research collections in archaeology and their status became paramount issues during the mitigation studies of the 1970s. The increased numbers of collections have taxed the resources of many institutions, both in personnel and facilities, and have greatly augmented what was already a serious problem for many institutions—the care of their collections. This paper identifies the prerequisites for preservation of research collections and focuses on goals, collection policies, curatorial methods, identification of potential users and certain requirements for facilities. The recent rehabilitation of the curatorial facilities of the Illinois State Museum is used to exemplify points raised in this paper. (14)

McPherron, Alan (see Hamilton, Nathan D.) (39)

Mead, Jim I. (see Meltzer, David J.) (19)

Meltzer, David J. (Smithsonian) and Jim I. Mead (Arizona) RADIOCARBON DATING AND LATE PLEISTOCENE EXTINCTIONS. While there is a marked interest in various causal theories of Late Pleistocene extinctions, not since Martin (1967) has there been a systematic review of the radiocarbon record of the extinction process. We review radiocarbon dates of large extinct vertebrates for the period between 40,000 and 8000 BP. We examine biases that affect that record, which include taphonomic factors, contamination and association errors, experimenter bias and sampling error, among others. Theories advanced to account for the Late Pleistocene extinction of some 32 genera of large herbivores and carnivores are then examined in light of these biases. (19)

Merrick, H. J. (Harvard) AGAINST THE GRAIN: THE SIGNIFICANCE OF ETHNIC NONCONFORMITY IN URBAN SITE EVALUATION. In evaluating the significance of ethnic and minority sites in urban contexts, archaeologists must deal with problems of assimilation and rapid change in a plural society. These problems require comparative analyses of the archaeological assemblages (in this case, refuse) of both dominant and minority cultures within shared economic strata before one can attempt to determine the degree of dissimilarity in the use of con-

sumable goods by such groups. By using comparative data in this way, the extent of ethnic non-conformity or resistance to assimilation may be seen as one of the principal criteria for assessing site significance. (32)

Michels, J. S. (Penn. State), I. S. T. Tsong (Arizona State) and G. A. Smith (General Electric Research Lab.) EXPERIMENTALLY DERIVED HYDRATION RATES FOR OBSIDIAN IN THE VALLEY OF MEXICO. Fresh surfaces of obsidians are hydrated in the laboratory and the thicknesses of the hydrated layers are determined by hydrogen depth profiling using secondary ion mass spectrometry (SIMS), ¹⁹S nuclear reaction and optical microscopy. From our results, we establish hydration rates for gray obsidian from Otumba and for green obsidian from Cerro de las Navajas that occur in archaeological sites within the valley of Mexico. (24)

Michels, J. W. (see Nelson, C. M.) (24)

Miksicek, Charles H. (Arizona State Museum) RECONSTRUCTING ANCIENT VEGETATION COMMUNITIES IN SOUTH CENTRAL ARIZONA. Within the past twenty years "environmental approaches" have been incorporated into the research designs of most major archaeological projects. More often than not, this research is based on the naive assumption that vegetational communities have not changed significantly in the recent past. In the American Southwest major shifts in the native vegetation have been documented since the wide introduction of cattle in the late 1800s, so this approach is invalid. For the Salt-Gila Archaeological Project in southern Arizona plant communities for the period 1880-1910 were first reconstructed using historical data to provide an interpretive baseline. Then using climatic, ecological and archaeological data, these associations were extrapolated backward to cover the period between 700 and 1400 AD. These reconstructed communities will be used in studies of resource availability, foraging strategy, agricultural techniques and environmental manipulation. (5)

Miller, Peter S. (High Plains Consultants) THE BIG BUSINESS OF SMALL-SCALE SURVEYS. Small survey work accounts for a major portion of the funding for archaeology in the western United States. There has been a very rapid rise of private companies that emphasize this kind of archaeology. The intense competition for this work is resulting in management methods and approaches that academic programs are poorly organized to match. Most archaeologists are either unaware of this activity or find it anathema to their interests. This paper discusses the development of big business in small-scale archaeology and the directions it is taking. (40)

Milner, George R. (Illinois) THE HEALTH STATUS OF MISSISSIPPIAN PEOPLES IN THE AMERICAN BOTTOM. Several archaeological and paleopathological data sets are examined in developing a comprehensive model of the health status of the Mississippian peoples who occupied the American Bottom region of Illinois. Community health is determined by complex interrelationships between people, their culture and the physical environment. The level of health is measured using several skeletal indices of morbidity and mortality. The patterning of disease stress is related to Mississippian period subsistence strategies, settlement patterns and the regional integration of population aggregates. (11)

Milner, George R. (see Emerson, Thomas E.) (11)

Mitchum, Beverly A. (GAI Consultants) XAMAN KIWIK: CHANGING FUNCTIONS IN A SMALL EARLY CLASSIC COMMUNITY. Xaman Kiwik is a small plaza group on the Rio Hondo near Santa Elena, Belize. During 1981 a large range structure in the group was excavated. The excavations uncovered well preserved masonry walls associated with a multi-room structure. A ceramic vessel associated with a burial dates the construction to the Early Classic (AD 300-500). The building contains three attached structures which represent distinct construction episodes. Analyses of the room arrangements, architectural features and recovered artifacts suggest that the structure modifications are associated with changes in the function of the building from an elite residence to a local administrative center. (51)

Moholy-Nagy, Hattula (Michigan) ARTIFACTS OF SHELL, BONE AND GROUND STONE FROM THE CENOTE OF CHICHÉN ITZÁ. A small collection of artifacts from the Cenote of Chichén Itzá is discussed. Cenote materials are virtually without context. An attempt will be made to establish spatial, temporal and cultural or systemic context by comparisons with materials from other Lowland Maya Area sites. Published sources will include reports on sites in northern Yucatán, Belize, and the Peten of Guatemala. The unpublished artifact collections from Tikal will also be utilized. (17)

Montgomery, John L. (Colorado) LITHIC ASSEMBLAGE VARIABILITY AMONG CONTEMPORANEOUS ANASAZI HOUSEHOLDS. Excavations by the Dolores Archaeological Project provide a sample of sixteen Sagehen Phase (AD 800-825) sites. By holding time and geography constant, the proposed economic autonomy of Anasazi households is tested by describing and

analyzing the variability exhibited by the household lithic assemblages. Computer aided multivariate analyses of contemporaneous household lithic assemblages is one way to investigate household economic autonomy. Variables used in this analysis focus on morphological, technological and functional attributes of ground stone tools and flaked lithic tools and flaked lithic tool byproducts. (49)

Moore, James A. (Queens) ARCHAEOLOGICAL MODELS, METAPHORS AND SOCIAL CHANGE. For American archaeologists the study of social organization has revolved around two issues: the recognition of social groups and the identification of social positions in these groups. In these tasks the archaeologist has been relatively successful. However, the research program of ethnography with a shovel has been much less successful in dealing with the issue of social change. Ecological, demographic and information-handling orientations have provided processual routes to the study of social change. Each orientation is based on a metaphor which posits a specific drive for social change. By combining these sometimes contradictory drives a more dynamic and dialectic notion of social change can be developed. Data from the Swedish Neolithic are used to demonstrate this approach. (2)

Morrow, Carol A. and Richard Jeffries (Southern Illinois) CURATE THEORY AS A MEANS OF DETERMINING THE ROLE OF LITHIC MATERIAL IN CULTURE SYSTEMS. Chert resource utilization is examined using the principle of least effort. Flaked stone artifacts are analyzed using a typology designed to distinguish local and nonlocal cherts in conjunction with a second typology devised to evaluate the role of these artifacts in the technological system. The processes of procurement, manufacture, use, maintenance and discard are used to evaluate the role of local and nonlocal chert resources in the context of a culture system. Based on the principle of least effort, it would be expected that nonlocal cherts would be used for specialized purposes. Flaked stone artifacts attributable to Archaic and Woodland components from southern Illinois are used in the analysis. (13)

Most, Rachel (see Lerner, Shereen) (25)

Mrozowski, Stephen A. (Brown) URBANIZATION AS A FACTOR IN ARCHAEOLOGICAL SITE FORMATION. This paper discusses a method which aids the explication of urban site formation processes. The method combines the results of documentary research which focuses on Newport, Rhode Island's early development, with data generated from a statistical analysis of three major trash deposits. The aim is to demonstrate the role urbanization plays in the formation of archaeological sites. Specifically, the method allows one to isolate individual household assemblages thereby strengthening the correlation of social units, such as households, with assemblages recovered from complex urban features. (32)

Muessig, Hans (see Dennett, Sarah) (52)

Mulholland, M. T. (see Cole, John R.) (23)

Muller, Jon (Southern Illinois) SALT, SPECIALIZATION AND MISSISSIPPIAN PRODUCTION. A high degree of specialization has been proposed for Mississippian salt production at various locations throughout the Greater Southeast. This proposed pattern is at odds with the model of Mississippian production that has been developed in the course of 13 years of research on the lower Ohio Valley Mississippian settlement. A program of testing various hypotheses has been developed at the Great Salt Spring near Shawneetown, Illinois. This paper will present the early conclusions from the first phase of this program and discuss the implications for Mississippian social and economic models. (39)

Murphy, Barbar A. (see Lange, Richard C.) (25)

Murry, Robert E., Jr. (Texas A&M) VEGETATIONAL CHANGE ON ANASAZI SITES, BLACK MESA, ARIZONA. Palynology was used to measure vegetational changes on Basketmaker II and Basketmaker III, Pueblo-I and Pueblo-II sites. In order to test for extent of vegetational change, a predictive model for past vegetation (empirically based on modern vegetation/pollen relationships) was used to relate individual samples to probable past vegetation patterns. Samples were fitted into the local pollen chronology recently established by Hevly. Extensive disturbance of the past environment by the Anasazi necessitated the use of adjusted pollen sums (exclusive of pollen types attributable to man) so that environmental indicators were comparable. (44)

Muse, Michael C. and T. Stocker (Politécnica Litoral, Ecuador) LIFE HISTORY OF OBSIDIAN ARTIFACTS FROM PEÑON DEL RIO: RESULTS OF PRELIMINARY ANALYSIS. Presentation of work in typology construction and edge wear analysis to describe geological, morphological and functional variation among technologically simple chipped stone artifacts from the Late Formative and Regional Developmental (1500 BC-AD 500) occupations of a site amidst raised fields in the

southern Guayas River Basin. Information and conclusions derived from the classifications and by quantitative examination of metric attributes, edge wear and artifact density by provenience are unified by means of modeling life histories for obsidian artifacts. (49)

Myers, J. Emlen and James L. Boone (Binghamton) ARCHAIC STATES OF MEDIEVAL MOROCCO: RESOURCE DISTRIBUTION AND TERRITORIAL ORGANIZATION. Recent theories of prehistoric state formation have emphasized systemic and functional/organizational principles as central to our understanding of the origins and developmental significance of states. These approaches on occasion seem at odds with the "behavior" of archaic states for which historic records exist. This paper explores one such historic case, medieval Morocco from the 8th through 11th centuries, assessing real and apparent differences between historic and prehistoric states through the application of a general model of resource competition and group formation. The model emphasizes resource density and distribution, military and agricultural technology and local/individual decision making. (9)

Neltzel, Jill E. (Arizona State) THE STRUCTURE OF EXCHANGE NETWORKS IN THE AMERICAN SOUTHWEST. The use of network theory in archaeological research has been infrequent and restricted to locational studies due to the difficulty in establishing connections between sites. The use of hypergraphs provides a means of linking sites and as a result permits the application of network analysis to a whole range of research problems. To illustrate the utility of this approach for archaeologists, an analysis was done of the structure of a prehistoric exchange network. The results provide insight into the nature of regional processes in the American Southwest. (20)

Nelson, C. M. (Massachusetts-Boston), J. W. Michels (Penn. State) and I. G. Tsong (Arizona State) OBSIDIAN DATING TO 50,000 YEARS IN EAST AFRICA. Prospect Farm, located on Mt. Eburru in the Gregory Rift in central Kenya, contains a long succession of Middle Stone Age, Later Stone Age and Pastoral Neolithic horizons. Flaked stone tools from this succession are made almost exclusively of obsidian from nearby sources. Bulk element compositional analysis revealed two groups of obsidians with compositions yielding significantly different hydration rates. Both types of obsidian were present in each of the archaeological horizons at Prospect Farm and produced internally consistent dates throughout the succession, over a range of 3000 BP to 50,000 BP. (24)

Netherly, Patricia J. (Massachusetts) and Tom D. Dillehay (Kentucky) FOREST AND COAST: IMPLICATIONS OF RECENT RESEARCH IN THE UPPER ZAÑA VALLEY OF NORTHERN PERU. The ecology of the upper valley of the Zaña River is unique in its resemblance to the *montaña* of the eastern Andean slopes. Survey and testing in this area have produced new evidence for a Pre-ceramic occupation with a lithic assemblage designed for the exploitation of forest and other plant resources, and an intensive and extensive Formative occupation, which shares many traits with Tropical Forest cultures of Amazonia. These adaptive strategies characterize later occupations of the forested area. (46)

Neusius, Sarah Ward (see Whatley Styles, Bonnie) (1)

Nichols, Deborah L. and Robert J. Huggins (Southern Illinois) PRELIMINARY MAGNETIC RECONNAISSANCE OF PRECERAMIC SITES IN NORTHEASTERN ARIZONA. Application of nondestructive geophysical remote sensing techniques in archaeology is relatively recent and testing is usually required to ascertain whether a given technique is suitable for a particular environmental setting and archaeological problem. Results of a magnetometer survey to detect subsurface remains on preceramic Basketmaker II sites on Black Mesa, Arizona, are discussed. The tested sites represent different types of magnetic environments and suggestions are offered for rapidly determining the suitability of magnetic survey under different environmental conditions. Comparison with other areas is made to compliment the results of this study. (47)

Nielson, J. Jerry (Corps of Engineers) and Bennie C. Keel (N.P.S.) CASE STUDY IN PRESERVATION STRATEGY: ROODS CREEK MOUNDS, GEORGIA. The Roods Creek Mound Group, situated in the confluence of the creek and the Chattahoochee River, received a cursory examination by the Columbus Museum in the late 1950s. Most of the site remained above Lake Eufaula created by Walter F. George Lock and Dam. In subsequent years river bank erosion began to destroy the site. The mitigation of this adverse impact by the Mobile District, U.S. Army Corps of Engineers and the National Park Service was by driving sheet piling around the area of erosion. (14)

Nordby, Larry V. (National Park Service) RUINS PRESERVATION IN THE SOUTHWEST. Resource management of exposed ruins in the Southwest is largely a matter of preservation through stabilization. Traditionally, stabilization projects directed by archaeologists have been the major vehicle for carrying out this mandate. Although such projects remain important, other aspects of

ruins stabilization are now emerging in the National Park Service. These include annual and cyclical maintenance programs, as well as the use of archaeologists as part of multidisciplinary teams. The ways that archaeologists can contribute to an overall program must relate to both the planning and completion of preservation projects and the various forms of ruins maintenance. (14)

Nurkin, Gary H. (Chicago-Kent College of Law) THE CONSERVATION OF ARCHAEOLOGICAL RESOURCES: FEDERAL LEGISLATION. During the past 80 years Congress has enacted two specific statutes to conserve archaeological remains. The first statute was designed to regulate excavations on public lands. The second statute modified and expanded the protection offered by the first through regulating not only the excavation of archaeological resources but also the sale, exchange or transport of these artifacts. These two acts are insufficient because they fail to protect archaeological remains located on private property. Expanding the scope of these acts to include the protection of archaeological resources located on private property increases their effectiveness in conserving archaeological remains. (48)

Odel, George H. (Center for American Archeology) A DIACHRONIC VIEW OF LITHIC ASSEMBLAGES FROM A STRATIFIED SITE IN THE LOWER ILLINOIS VALLEY. Three Archaic and one Middle Woodland lithic assemblage from the stratified site of Napoleon Hollow were submitted to a series of morphological, technological and functional analyses in order to study cultural change through time. These analyses were related to paleoclimatic and vegetational data in order to ascertain the extent of co-variation. Thereby, hypotheses concerning technological and functional parameters have been proposed and tested. (1)

Olsen, William H. (see Foster, John W.) (53)

Orcutt, Janet D. (see Kane, Allen E.) (25)

Padgett, Thomas J. (North Carolina DOT) RELEVANCE AND RESPONSIVENESS IN SMALL-SCALE SURVEYS FOR TRANSPORTATION AND PUBLIC WORKS PROJECTS. The small-scale archaeological survey must be reassessed in light of recent regulatory changes. We have brought adverse public reaction while attempting to legitimize cultural resource management to the profession. An examination of survey results shows that many small-scale surveys yield negative and redundant data that serves neither academic research or historic preservation goals. An approach that is responsive to project planners' needs and relevant to major research problems is necessary to establish archaeology and historic preservation as nonobstructionist. (40)

Paeltz, Timothy C. (Peabody Coal) THE COAL INDUSTRY. Archaeological investigations undertaken for the Coal Industry are required to meet specific needs of the industry. This paper will include a discussion of the objectives of the coal industry, the means by which these objectives are accomplished and the suggested role of archaeology in this process. Examples of actual or potential problems resulting from the failure of archaeologists to understand industry needs can be used as illustrations. Recommendations on how archaeologists might better serve the needs of the coal industry are included. (41)

Palmer-Niemczyk, Mary Ann (SUNY-Buffalo) ARCHAEOLOGY AND THE STUDY OF PRIMITIVE SOCIAL ORGANIZATION. Archaeological investigation of social evolution is still in its infancy. Archaeologists have not yet been able to describe the social processes responsible for the evolution of stable village life or tribal organization in prehistoric cultures. This paper presents a method for studying the evolution of tribal organization in which complementary anthropological and archaeological models are compared and tested using data on the New York Iroquois. The result is a specific theory of Iroquois tribal development and a descriptive and explanatory model for the evolution of tribal level sociocultural integration which can be further tested with specific cultural or cross-cultural data. (55)

Paradis, Louise I. and Evelyn Cossette (Montreal) SETTLEMENT PATTERNS IN THE TEPECOACUILCO RIVER DRAINAGE, GUERRERO, MEXICO. Systematic surface survey and collection in the Tepecoacuilco River drainage of the State of Guerrero, Mexico, has yielded information on some 75 sites in an area of 400 km². Using qualitative and quantitative methodologies, an attempt is made to understand the historical, economic and social or other determinants in the choice of settlements by Precolumbian inhabitants of the region. (42)

Parker, Sandra (Ark. Archeological Survey) VALIDATING MULTIVARIATE LOGISTIC MODELS OF SITE LOCATIONS USING SEQUENTIAL ANALYSIS. Multivariate logistic models for predicting site locations were derived from sample data for the Sparta area, an area in south central Arkansas of approximately 14,000 hectares. The regularities observed in the surveyed sample between the biophysical environment and settlement locations are used to predict the probability of site

presence in the unexamined portions of the area. A second phase of survey is conducted for the application of a sequential analysis designed to test the validity of the logistic models. (37)

Parmalee, P. (see Guilday, J.) (45)

Parrington, Michael (see Hunter, Richard) (7)

Patterson, Leland W. (Tenneco) **ARCHAEOLOGY IN THE OIL AND GAS INDUSTRIES.** A significant number of archaeological investigations are being made by the oil and gas industries in relation to environmental regulations. This paper discusses the scope of this work, the specific requirements of these industries and methods used to comply with regulatory requirements. Examples of actual and potential problems are given in relating archaeological activities to industrial objectives. Recommendations are made on how archaeologists can better serve the needs of these industries. (41)

Paynter, Robert (Mass.) **FIELD OR FACTORY? CONCERNING THE DEGRADATION OF ARCHAEOLOGICAL LABOR.** A frequently excoriated impact of CRM is the domination of an accounting mentality. This is reflected in field and lab situations by the minute analysis of work into a series of accountable tasks. A similar process occurred in more traditional workplaces with the shift from craft to trade production. Comparing cases from 19th century workplaces and recent archaeological manuals leads to the conclusion that different imperatives structure each transformation. Finally, CRM work is not wedded to the profit motive and is more closely allied to academic archaeology in the production of 20th century ideologies concerning the past. (31)

Pearsall, Deborah M. (Missouri) **THE SUBSISTENCE BASIS OF THE COASTAL ECUADORIAN FORMATIVE.** Recent ethnobiological research, carried out in conjunction with excavations at Formative period sites, is reviewed. The strengths and weaknesses of data recovery techniques, including flotation and phytolith analysis, are discussed, and suggestions for the application of ethnobiological techniques to future excavations made. A discussion of major questions regarding the nature of the subsistence basis of the coastal Formative centers around the problems of the early appearance of maize, the relationship of root and seed crop cultivation and the role of sea versus land resources in the coastal zone. (30)

Peebles, Christopher S. (IPP-Amsterdam) **SOCIAL EVOLUTION AND DEVOLUTION AT MOUNDVILLE: THE VIEW FROM THE ECONOMY.** The evolution of the complex, ranked, hierarchical social and settlement system that characterized the Moundville phase (AD 1050-1500) in west central Alabama was accompanied by equally complex developments in its economic system. At its zenith, the Moundville economy encompassed the flow of tribute from periphery to the center, rudimentary craft specialization, a prestige-goods sector and a widespread exchange network. These aspects of the economy, all of which were supported by (but above and beyond) the subsistence sector, seem to have been monopolized by the "elite." When the limits to the "social surplus" were reached, it was these secondary and tertiary aspects of the economy that failed first, and precipitated the devolution to a less complex form of social organization. (2)

Pendergast, David M. (Royal Ontario Museum) **THE POSTCLASSIC IN NORTHERN BELIZE.** Little understood prior to the 1970s, the Postclassic of northern Belize can now be seen to have embodied surprising richness and variety in which distinctive local styles are blended with traits that link the communities of the area with those farther north in the Yucatán. Excavation data document a continuum from Classic and earlier times through the latter part of the 17th century, and permit us to recognize patterns that link individual community histories. From such recognition comes an understanding of some of the dynamics of change and the forces behind continuity in northern Belize, as well as of the place of the region in Lowland Maya prehistory during the Postclassic. (3)

Periman, Stephen M. (Virginia Commonwealth) **ECOLOGICAL MODELS IN AMERICAN ARCHAEOLOGY.** Information about the environment has been included in American archaeological reports since the mid-20th century. The environment's role has ranged from a context for past social systems to their determinant. These approaches can be contrasted by their relative emphases on the role of social decisions in social change. Do individuals or groups have a voice in their affairs or is their behavior environmentally determined? While an answer is still being sought, recent developments in ecological theory are providing insights into why behavior and community structures might change. (2)

Perry, Leslie and Douglas Kennedy (Midwest Archeological Center) **A COMPARISON OF WOODLAND TECHNOLOGY IN SOUTHERN MISSOURI AND NORTHWESTERN WISCONSIN.** Archaeological testing at Ozarks and St. Croix National Scenic Riverways (1979-1980; 1981) have produced assemblages of Woodland lithic materials exhibiting distinctive reduction technol-

ogies. A contention that the different technologies are significantly correlated to the type and availability of lithic resources in the two regions is examined by comparing lithic source types, core percentages, flake scars per core, degree of core decortification, variance of flake scars and length-width ratios of flakes from sites located in the two riverways. The analyses point toward some of the needs and considerations underlying the two divergent technologies. (16)

Petersen, James B. (see Hamilton, Nathan D.) (39)

Phinney, Chad T. and Gina Laczo (Pueblo Grande) **RETHINKING THE PUEBLO GRANDE INTERACTION SPHERE.** A number of interaction models, based on the presumed cooperation needed to plan, construct, maintain and administer the irrigation system found in the Salt River Valley during the Classic Period Hohokam, have been proposed. Data from Pueblo Grande, however, suggest that these may be inaccurate due to overestimation of Classic site size. Previous assumptions are questioned and alternative measures of site size in administrative and central place terms are proposed. Based on these new measures of functional site size an alternative series of cooperative or administrative units is proposed for the Salt River Valley during the Classic Period Hohokam. (15)

Plog, Stephen (Virginia) **ORGANIZATION AND CHANGE IN NORTHERN ARIZONA.** Hypotheses concerning organization and change on northern Black Mesa, Arizona during the period from AD 800 to 1130 are evaluated using both survey and excavation data collected during the last decade. In particular, proposals concerning procurement strategies and population mobility, the spatial extent and structure of exchange networks, intersettlement relationships and patterns of demographic change are tested. In addition, the extent to which general models of change can account for the observed diachronic patterns on Black Mesa as well as in other parts of the northern Southwest is examined. (44)

Porter, James W. (Illinois) and John A. Walthall (IDOT) **AMERICAN BOTTOM ARCHAEOLOGY AND THE FAI-270 PROJECT.** American Bottom archaeology is discussed in terms of research problems. Introductory remarks for the FAI-270 Project focus on the results of excavating 82 sites. The magnitude of the Project recovery program was unprecedented within Illinois and required a new, more intensive level of cooperation between engineer and archaeologist. The fieldwork was completed on time and in a cost efficient manner, thereby demonstrating the success of this cooperative effort. Both sides learned lessons about managing large scale endeavors. The problems encountered and the solutions devised are described and evaluated. (11)

Portnoy, Alice W. (Texas Tech) **CLIENT ORIENTED ART AND ARCHAEOLOGY: LESSONS FROM THE PAST.** An analogy is made between contract archaeology and medieval and Renaissance European painting, both of which are seen to be "client oriented." Contracts, specifications, anonymity, teamwork, specialization, quality, creativity, craftsmanship, workshop organization and final products are described for each realm. Clients and their requirements are discussed. Guilds and other professional developments are described. Training in the apprentice/journeyman/master system is illustrated for each activity. Historical and contemporary trends and good and bad effects of contracted work and client orientations are noted. Suggestions are made for lessons to be learned by archaeologists from this analogy. (48)

Potter, Stephen R. (NPS) **LOW BUDGET AND LOW ALTITUDES: AERIAL PHOTOGRAPHY AND ARCHAEOLOGICAL SURVEY IN TIDEWATER VIRGINIA.** Aerial survey over portions of Tidewater Virginia proved successful in identifying numerous archaeological sites of various types, while allowing coverage of extensive tracts of land for a comparatively low cost. Experimentation during various seasons, over a three year period, proved that the optimum time for spotting sites was in late winter and early spring. Flights were made at low altitudes between 500 and 1,000 feet. For the best photographic results, consideration was given to the height and angle of the plane, the angle of the sun, the direction of cultivation and the size and nature of the archaeological site. (52)

Powell, Shirley (Southern Illinois) **FOOD STORAGE AND ENVIRONMENTAL UNCERTAINTY: AN EXAMPLE FROM BLACK MESA, ARIZONA.** Models of cultural change employing a theoretical ecological framework recognize that individuals and populations seek to maintain themselves under conditions of environmental change. Responses to environmental perturbations can be hierarchically and inclusively classified and the order in which they are activated can be predicted: superficial, individual responses will be enacted prior to embedded, group responses. This theoretical orientation will be used to retrodict changes in technology and organization for the Black Mesa Anasazi of northeastern Arizona. The proposition that food storage behavior was one likely response to environmental and productive uncertainty is investigated. Storage of foodstuffs is predicted to occur initially on the individual or household level; if this response is

unsuccessful for dealing with food shortages, the quantity of storage space will increase and the coordination of food storage activities will take place at higher levels of organizational integration. (44)

Price, Cynthia R. (see Price, James E.) (16)

Price, James E. and Cynthia R. Price (Southwest Missouri State) OZARK NATIONAL SCENIC RIVERWAYS ARCHAEOLOGICAL RESEARCH PROGRAM. Southwest Missouri State has carried out the initial stage of a multi-stage, five-year archaeological research program on the Current and Jack Fork Rivers in Ozark National Scenic Riverways. The first year of the project has been dedicated to assimilation of historical background data, study of amateur archaeologists' collections, pedestrian survey of wildlife foodplots and geomorphology of these two major river valleys. Primary goals of the project are to gather data on both the prehistoric and historic past in order to solve problems of both a chronological and systemic nature. Future stages of the project will involve extensive pedestrian survey and testing and excavation of selected sites. (16)

Price, T. Douglas and Maureen Kavanagh (Wisconsin) BONE COMPOSITION AND THE RECONSTRUCTION OF DIET. Recently employed chemical analytical methods offer a means for measuring past subsistence practices. Carbon isotope analysis and trace element analysis provide indications of the importance of certain dietary components. The present study deals with the trace element analysis of human bone samples from prehistoric sites in Wisconsin. Changes in strontium values through time suggest increasing plant use from Late Archaic through Mississippian. Comparison is made to other similar studies of diet. (22)

Purdue, James R. (see Whatley Styles, Bonnie) (1)

Purdy, B. (see Jurgensen, A.) (24)

Raber, Paul A. (Pennsylvania State) THE DEVELOPMENT OF COPPER METALLURGY IN CYPRUS. A recent program of research in the Polis region of Cyprus provides information on the history of metallurgical technology and its relation to changes in economic and political organization on the island over a period of 2,500 years. The combined data of survey and testing of metallurgical sites and the chemical analysis of smelting slags from these sites yield, in combination with previously published information on metallurgical sites in other areas of the island, a more complete picture of copper smelting technology and its organization over a long period on an island widely known in the ancient world for its production of the metal. (27)

Rackerby, Frank (Arkansas Archeological Survey) AN UPDATE ON KINCAID RESEARCH AND DEVELOPMENT—1976–1981. After years of effort by concerned citizens, the State of Illinois purchased most of the Kincaid site as an archaeological preserve, a research laboratory and, ultimately, an interpretive area for the public. Perspective is set by a summary of previous work. Material from the University of Chicago's 1930s expeditions' correspondence, journals and field notes provide insights and anecdotes on the intellectual history of Kincaid. Recent developments at the site are reviewed to measure achievements toward research, management and conservation goals. State officials, concerned researchers and others are queried as to what has or has not happened, and why. (39)

Rafferty, Janet E. (Mississippi State) THE ARCHAEOLOGICAL RECOGNITION OF THE DEVELOPMENT ON SEDENTARINESS. In discussing cultural sequences, archaeologists tend to remark on the development of sedentariness only in passing, if at all. There has been little attention paid to the consequences of its development or to how it can be recognized archaeologically. This paper proposes a definition of sedentariness and evaluates the reliability of a series of archaeologically-recoverable indicators of its development. No one kind of evidence is conclusive, but the appearance of a complex of indicators in an archaeological sequence can allow a convincing argument to be made that the group in question has become sedentary. (21)

Raish, Carol (see Graham, Martha) (4)

Ramenofsky, Ann F. (Washington) ARCHAEOLOGICAL EVIDENCE FOR EUROPEAN DISEASE AND NATIVE AMERICAN DEPOPULATION. Archaeologists have not previously considered the Kroeber-Dobyns debate on precontact aboriginal population size, disease introduction and post-contact decline. Archaeological demography have other foci and archaeological interval level measures of population are frequently based on ethnographic estimates. The debate is outlined. Late prehistoric and early historic settlement records from central New York, Lower Mississippi Valley and upper Missouri Trench are employed to build regional descriptions of demographic change that are independent of ethnographic estimates. All records indicate catastrophic population loss prior to sustained European colonization. Disease is the only variable that could cause such decline; Dobyns' position is supported. (23)

Rands, Robert L. (Southern Illinois) and Ronald L. Bishop (Brookhaven) EXCHANGE AND LOCALIZED DISTRIBUTION OF MAYA FINE ORANGE-FINE GRAY CERAMICS. Neutron activation analysis of Fine Orange and Fine Gray pottery fails to support widely held hypotheses that these ceramics were manufactured in a single geographically restricted region. In the Usumacinta drainage, at least, minor differences in chemical composition tend to covary with archaeological provenience, indicating that the pottery only occasionally entered into interregional trade. The previous data base is expanded by extensive sampling of materials from Campeche and Yucatán, contributing to a better perspective of economic systems of the Late Classic and Early Postclassic periods. (51)

Randsborg, Klaus (Copenhagen) HISTORICAL PROCESSES AND CULTURE CHANGE. The concept of historical process as representing the "noise" in an adaptive social system is hardly understandable to most European archaeologists who tend to ignore "history" for the study of patterns of culture and economy. A case can be made for seeing all acts of behavior as being historical and for cultural and social phenomena as a universe governed by actions of various strengths and directions which repeatedly are constrained by other factors. The study of culture change in this manner has been hampered by the methodological difficulties of determining cause and effect. The theoretical and methodological aspects of studying the role of historical factors in culture change will be exemplified through an examination of the Roman period and earlier Middle Ages (Viking) period in Scandinavia. (2)

Raphael, Bettina (SAR) CONSERVATION IN THE FIELD. The proper care and preservation of archaeological materials should begin in the field, as the artifact is excavated from its environment and prepared for transport and temporary storage. Conservation planning and budgeting should be part of the earliest stages of designing any archaeological project. Archaeologists traditionally have not been adequately trained to anticipate and cope with the special handling, packing and preservation needs particularly of perishable specimens. There are practical protective measures that the archaeological field crew can take to prevent irreparable damage to an artifact when it is recovered and to keep it stable for future analysis or until more extensive preservation treatment can be carried out by a professional conservator. (54)

Redding, Richard W. (Michigan) AN EXPLANATION OF VARIATION IN THE SHEEP/GOAT RATIO FOR MIDDLE EASTERN ARCHAEOLOGICAL FAUNAS. The sheep/goat ratio is usually provided for Middle Eastern sites with samples of domestic sheep and goats. Published explanations of temporal and spatial variation in this parameter are inductively derived from single character differences between sheep and goats. The sheep/goat ratio reflects decisions made by herders based on characteristics of the animals (by sex, age and species), and the environmental and economic variable states. Decisions made are goal-directed. Optimization models were used to obtain sets of predictions for a series of environmental states for six hypothetical goals. Tests indicate the goal of prehistoric herders was herd security. (22)

Reid, J. Jefferson and Stephanie M. Whittlesey (Arizona) DETERMINING FUNCTIONAL EQUIVALENCE IN SETTLEMENT ANALYSIS. Models of prehistoric settlement systems are reconstructed through interassemblage comparative techniques which produce classes of functionally equivalent settlements. Techniques and models are illustrated with cases of a respectable sample size drawn from a large contract project in the American Southwest. Points of disagreement with related analyses are noted. (21)

Reid, Kenneth C. (Tulsa) and Joe Alan Artz (Kansas) ENVIRONMENTAL STRESS AND THE ORIGINS OF ARKANSAS BASIN CADDOANS: A CROSS TIMBERS PERSPECTIVE. Independent pollen, land snail, molluscan and soil-geomorphic sequences from the Cross Timbers of northeastern Oklahoma indicate that after AD 600 precipitation became more variable and frequency of short-term droughts increased. The transformation of Woodland foragers into Caddoan horticulturalists between AD 650 and 950 reflects efforts to sustain high population densities in a decreasingly predictable environment. Small aceramic "Late Woodland" or "Plains Village" components in the Cross Timbers probably are the seasonal hunting camps of early Caddoans operating out of game-depleted horticultural core areas to the southeast, an interpretation supported by excavation of a small winter base camp composed of semisubterranean "hothouse" structures. (23)

Reidhead, Van (Missouri-St. Louis) THEORY, METHOD AND THE TRANSITION TO FOOD PRODUCTION. Using Eastern North America as a case, this paper examines contemporary theoretical and methodological efforts to illuminate the transition to food production. It seems timely to take stock of what the major analytic approaches offer in the way of explaining the beginnings of food production. What are the strengths and weaknesses in our current understanding? What can be done to improve the present state of understanding? Within the context of a general synthesis of Eastern Woodlands data, these questions are explored through a critical examination of the ways we have tried to analyze and explain the transition to food production. (2)

Renfrew, Colin (Cambridge, England) PEER POLITY INTERACTION AS AN ANALYTICAL FRAME. The concept of peer polity interaction designates a frequently undervalued agent of social and political change. Most models currently employed to explain social transformations focus either on core/periphery (primary/secondary) relationships where one polity is in a position of dominance, or examine the organizational changes taking place within a single polity in response to population growth or other factors. But the interchanges taking place between a number of politically autonomous units situated within a single region are often of determining importance for the growth trajectories as well as for the emerging ethnic consciousness and the 'style' of the culture or civilization. (36)

Reyman, Jonathan E. (Illinois State) ADAPTATION, ASTRONOMY AND ARCHITECTURE AT MESA VERDE. To achieve successful harvests, given the relatively short growing season at Mesa Verde, the Anasazi needed a good understanding of seasonal variations in temperature and rainfall patterns. Possession of a reliable yearly calendar would have helped Mesa Verde peoples understand local seasonality, the better to organize their farming activities so to increase the likelihood of adequate food production. This calendar could have also been used to improve chances for success in hunting-gathering. Analyses of Mesa Verde sites indicate that the people devised a solar calendar which they incorporated into architectural features at several pueblos. (47)

Reynolds, Georgeanne L. (SUNY-Binghamton) OWNERSHIP MARKS FROM UTKIAVIK (BARROW) ALASKA. Late Thule ownership marks on ivory, bone and antler arrowheads and harpoon heads is a subject largely passed over in the literature. This paper attempts to explain their distribution between Point Barrow (Nuwuk), Utkiakivik and Walakpa Bay and to uncover regularities in terms of social or familial affiliations. It has been suggested that the inhabitants of Walakpa Bay may have been related to those of Nuwuk. Because Utkiakivik is situated between the two, it provides an excellent data base with which to test this hypothesis. Both intra-site and inter-site similarities and variability will be examined to determine crucial linkages between settlements. (28)

Rice, Glen E. (Arizona State) IMPROVING OUR METHODS FOR PREHISTORIC COMMUNITY PATTERN ANALYSIS. The refinement of processual models of prehistoric change can be enhanced by examining patterns of social change at the community level. To do this, however, requires comparable types of analyses conducted at relatively large numbers of sites from different periods and regions. Current approaches are either not widely applicable or are too time consuming for widespread use. This paper considers one method for community pattern analysis which can be used efficiently on large bodies of data and which generates comparable results across regions. Applications to Archaic sites in Arizona and California are provided. (21)

Richardson, Miles (Louisiana State) THE TEMPLE AND THE AUDITORIUM: INTERPRETING THE MATERIAL CULTURE OF THE SPANISH AMERICAN IGLESIA AND OF THE SOUTHERN BAPTIST CHURCH, AN IDEATIONAL-BEHAVIORAL APPROACH. The ideational-behavior approach sees material culture as a form of symbolic communication, a text, by which people both shape and express the experiences of social interaction. Spanish Americans create a sense of the sacred out of their experiences by grounding the sacred in the sensuousness of place, and their *iglesia* becomes a temple. Southern Baptists establish a sense of the sacred through deemphasizing place and stressing the word, and their church becomes an auditorium. Applied to archaeological data, the approach suggests that the archaeologist become an interpretive reader who deciphers artifactual remains to gain access to the public meaning the remains communicate. (26)

Richner, Jeffrey J. (Midwest Archeological Center) OLD MUNISING: ECONOMIC BOOM AND BUST AT A 19TH CENTURY COMPANY TOWN. Results of recent archaeological fieldwork at the original townsite of Munising, Michigan are presented. Excavations combined with records searches and laboratory analyses provide considerable economic and historic data regarding late 20th century occupation of this small northern town. Recovered archaeological remains span the period ca. 1870-1900, covering the short "boom and bust" cycle which characterized the town's history. Artifacts discovered in stratified contexts associated with several domestic structures provide evidence of economic and lifestyle changes related to the unstable economic conditions which prevailed. A simple and rather stark lifestyle appears to have characterized occupation of Old Munising. (16)

Riddell, Francis A. (California Parks) ARCHAEOLOGY AND THE CALIFORNIA PARK SYSTEM. The California Department of Parks and Recreation has had a long history of both conservation and restoration archaeology. Because of the role it is appropriate to acquaint the profession with the results of its cultural resource management program. The consequential work done by the Department at Fort Ross Santa Cruz Mission, Cooper-Molera Adobe, Old Town San Diego, Old Sacramento, San Juan Bautista and other historic projects is elucidated. The program of prehistoric archaeology is discussed with reference to recent demands from California Indians. (48)

Riddell, Francis A. (see Foster, John W.) (53)

Rigaud, Jean-Philippe (see Larick, Roy R.) (21)

Rindos, David J. (Cornell) MODELING SUBSISTENCE CHANGE. A mathematical model is developed to demonstrate how a gradualistic process like coevolutionary domestication can account for radical changes in human subsistence patterns. It is shown that the type of relationship existing between man and evolving domesticates dictates an exponential relationship between abundance of domesticates and their relative contribution to the diet: this accounts for the apparent "sudden" appearance of agricultural subsistence in the archaeological record, it predicts the existence of domestication symbioses at a very early point in time and it accounts for the "broad spectrum" revolution. Predictions from the model fit well to at least one archaeological data set. (8)

Rippeteau, Bruce E. (see Tate, Marcia J.) (40)

Roberts, Michael E. (Harvard) SYSTEMS ENGINEERING AND PUBLIC INFORMATION. A systems engineering approach to the design and implementation of public information programs for a large-scale archaeological project is discussed. The process for designing the program, the goals of the program and the description of the Salt-Gila Aqueduct project resulting from this program are discussed. Each of the separate elements of the project is described and their interaction and application to the goals of the Salt-Gila Aqueduct public information program are described. Finally, the cost-efficiency of the program and an evaluation of success to date are described. (5)

Robertson, Robin (Southern Methodist) THE PROTOCLASSIC OF NORTHERN BELIZE: THE CERAMIC EVIDENCE. The end of the Late Preclassic Period in the Maya lowlands has traditionally been marked by the appearance of Floral Park diagnostics. These diagnostics have been interpreted as representing a site unit intrusion from the highlands which necessitated sociopolitical and economic changes culminating in the development of lowland Maya civilization. An examination of the ceramic data from northern Belize and a revision of the highland sequences have cast some doubt on the impact of this invasion. Alternatively a model of 300 years of dynamic interaction among the potters is suggested. (3)

Roemer, Erwin (Texas A&M) A LATE CLASSIC LITHIC WORKSHOP AT COLHÁ, BELIZE: PROBLEMS OF ANALYSIS. At Colhá, chert blade and biface production evidence from a workshop deposit of Late Classic context presents unusual possibilities for lithic analysis. Various aspects of the collection promise insight for the process of lithic analysis and Mayan production systems. (51)

Rogers, Anne F. (Western Carolina) AN INTERPRETATION OF THE PREHISTORIC OCCUPATION OF EIGHT ROCKSHELTERS IN SOUTHWESTERN VIRGINIA. Excavation of eight rockshelter sites in southwestern Virginia has disclosed evidence of occupational episodes ranging from the Early Archaic to Late Woodland periods. Each appears to have been the locus of hunting-related activity. Large quantities of bone and numerous bone tools recovered from the largest of the shelters indicate its utilization as a butchering and processing station. Analysis of lithic material shows use of local and nonlocal resources for tool manufacture. The data recovered contributes important information about an area which is little known archaeologically and establishes a basis for developing hypotheses concerning the occupation of these sites through time. (55)

Rogers, J. Daniel (Oklahoma) RECENT EXCAVATIONS AT SPIRO MOUNDS, EASTERN OKLAHOMA. In the 1930s diggings by pot hunters and excavations by the WPA revealed the importance of an unusual nature of the Spiro site. They did, however, concentrate on only certain aspects of the site, usually the most obvious portions. This approach has left a gap in our understanding of many of the details of the village occupations. Consequently, excavations were resumed at Spiro in the summer of 1979. Most of the work was directed towards testing the village area. Results from the work include identification of three additional mounds, improved interpretation of chronology and subsistence and technology. (39)

Rogge, A. E. (Reclamation) THE SALT-GILA AQUEDUCT ARCHAEOLOGICAL PROJECT: BACKGROUND AND CONTEXT. The history, scope and controversy of the Central Arizona Project (CAP), a Bureau of Reclamation water development project and the associated cultural resource program are described. The niche that the Salt-Gila Aqueduct archaeological project occupies within the CAP program is discussed by outlining the history of survey and design of mitigation plans, the approach to study management and the potential research results. (5)

Roper, Donna C. (Commonwealth Associates) PREHISTORIC CULTURAL STABILITY IN THE MISSOURI OZARKS: A TRIAL MODEL. The Woodland period in most of the midwestern United States is marked by major changes in settlement, subsistence, social organization and

demography, changes that lead to a ready division into Early, Middle and Late periods. The Missouri Ozarks are geographically contiguous with areas where Woodland period culture change is well marked, yet the prehistoric Ozarkers seem to have been largely unaffected by these changes. Our purpose therefore is to seek to understand cultural conservatism and the sources of cultural variability in the midwestern United States during the Woodland period. (39)

Rowley-Conwy, Peter (Cambridge) EUROPE FROM THE END OF THE LAST GLACIAL TO THE START OF FARMING. The contemporary view that the European Mesolithic was characterized by small, mobile groups is oversimplified because of two unfounded assumptions: (1) that the deciduous forest was a hostile environment and (2) that hunter societies do not have the social mechanisms to maintain large, permanent settlements. This notion of Mesolithic society underlies the conception that sedentism in "subneolithic" groups was a precursor to farming. The alternative view that Mesolithic sedentism occurred in the areas of favorable environments and that permanently settled groups in these areas may account for the delay of the spread of farming is presented. (2)

Rubertone, Patricia E. (Brown) MEASURING ORGANIZATION: EXAMPLES FROM URBAN ARCHAEOLOGICAL RESEARCH. Trends in the archaeological study of cities indicate greater emphasis on questions of urban organization and organizational change through time. Of specific concern to archaeologists is the issue of developing measures of organizational complexity and identifying suitable material correlates in the archaeological record. Urban historical archaeology can contribute to this research since the rich documentary sources associated with this urban archaeological data base offer excellent controls for testing notions of urban organization and change, and for evaluating its archaeological correlates. Several measures of urban organization in terms of population, economics and integration are discussed. Examples are drawn from urban archaeological research in Providence. (32)

Russell, Nerissa (UC-Berkeley) EXPERIMENTATION AS AN AID TO THE STUDY OF MANUFACTURE AND UTILIZATION PATTERNS OF BONE ARTIFACTS. Testing of theories related to production and consumption in prehistoric economies requires controlled experimentation performed on modern materials of all artifact classes. This paper discusses the use of experimentally produced microwear on bone in the reconstruction of butchering and tool manufacture and use practices. While most previous studies have concentrated on the action with which the tool is used, these experiments focus on the contact material. Microscopic examination reveals distinctive patterns for many contact materials; however, soft, organic materials are difficult to identify. (22)

Sabloff, Jeremy A. (New Mexico) INTERACTION AMONG LATE CLASSIC MAYA POLITIES. The development of complex society in the Maya lowlands during the Preclassic and Classic periods is a good case example of Renfrew's model of the growth of the early state through peer polity interaction during the Late Classic period to demonstrate that the model has potential explanatory power for the Maya collapse as well. Maya political organization is explored as is the social, material, and symbolic ties among the Late Classic polities which could have reinforced their interdependence. (36)

Sabo, Deborah R. (Arkansas) USE-WEAR ANALYSIS OF A MICHIGAN CHERT. An experimental study of use-wear characteristics of Norwood chert, a lithic material of local importance in Michigan archaeology, is being performed using low- and high-power magnification. Results of the experiments are being applied to the study of Late Woodland site collections, in an attempt to define functional types. Conclusions are drawn pertaining to several problem areas in the field of use-wear analysis: the relationship of tool form to function, the types of wear appearing on coarse grained as opposed to fine grained cherts and the masking effects of soil and other postdepositional conditions on wear traces. (49)

Sabo, George III (Arkansas Archeological Survey) THE HUNTSVILLE SITE (3MA22), A CADDOAN CIVIC-CEREMONIAL CENTER IN THE ARKANSAS OZARKS. The Ozark Highland has long been regarded as a geographically isolated area which during late prehistoric times remained peripheral to and largely unaffected by Mississippian cultural developments in surrounding regions. This paper presents the results of recent excavations at the Huntsville site (3MA22), a Caddoan civic-ceremonial center situated well within the Arkansas Ozarks. The presence at this site of a multistage substructural mound, plus the occurrence of corn and squash, attest to the emergence of Mississippian subsistence-settlement systems in the region. These findings add to a growing body of evidence concerning Mississippian adaptations to highland environments. (39)

Saitta, Dean J. (Massachusetts) THE EXPLANATION OF CHANGE IN EGALITARIAN SOCIETY: A CRITIQUE. Several researchers have recently explained changes in the archaeological record of

egalitarian societies in terms of an evolutionary process of increasing social integration under conditions of increasing environmental stress (e.g. Braun 1980; Plog 1980). These explanations are problematic in that they are based on methodology, stylistic analysis of domestic ceramics, which is inappropriate for tracking the organizational processes of concern. This methodology reflects more basic difficulties with the conceptual framework accompanying it. By redressing these difficulties we may be led to a more mature theory of social process in egalitarian society. An alternative conceptual framework is discussed and illustrated with reference to the archaeological record of the midwestern United States. (39)

Salzer, Robert J. (Beloit) APOSTLE ISLANDS ARCHAEOLOGY. The objectives, methods and preliminary results of a regional research project in the Apostle Islands area in the western end of Lake Superior are presented and discussed. Creative articulation of survey, testing and excavation strategies with funding from private and public sources and a series of agency cultural resource management needs provides important and somewhat surprising observations on reconstructed subsistence and settlement patterns for prehistoric peoples and for early Chipewewa Indian and Euroamerican occupations. The project illustrates an example of how archaeological research, community needs and federal agency management objectives can complement each other. (16)

Sampson, C. Garth (Southern Methodist) SPATIAL ORGANIZATION OF SAN BUSHMEN SITES IN THE ZEEKOE VALLEY, SOUTH AFRICA. The Zeekoe Valley, a tributary of the Orange River in central South Africa, has been intensively surveyed to test models of hunter-gatherer spatial organization. Preliminary analysis of more than 5,000 San Bushman (Smithfield) sites suggests that although they represent a single ethnographically documented culture, the archaeological record contains evidence delineating a series of band territories within the larger valley settlement area. The study of San sites forms a bridge linking the data on recent hunters with the Paleolithic past. The San settlement model, coupled with paleoecological studies, provides new insights into the distribution and adaptive strategies employed in more than 4,000 pre-San sites in the valley, ranging in age from the Wilton to the Acheulean. (18)

Sandoval M., Abelardo (SUNY-Binghamton) CHAVIN POLITICAL ADMINISTRATION IN THE CALLEJON DE HUAYLAS, PERU. Chavin, located in the Peruvian north highlands, expanded to cover a larger area in the Central Andes about 800 BC. By examining the use of public space this paper will deal with the nature of Chavin's administrative structure in the Callejon de Huaylas. This will be approached by analyzing the quantity, morphology and distribution of public architecture on a site, since it is argued that these will reflect the nature and degree of the Chavin political entity. Excavations at Huaricoto site have provided indicators of temporal control and the distribution of monumental architecture in the valley provides us with indicators of administrative functions. (46)

Sant, Mark B. and Barbara D. Stafford (Center for American Archeology) SITE STRUCTURE AND FUNCTION IN THE MIDDLE WOODLAND: AN EXAMPLE FROM SMILING DAN. Smiling Dan, a Middle Woodland habitation site, does not correspond to the traditional models of Middle Woodland settlement. These traditional models are examined in light of functional analysis of lithic and ceramic artifacts and the depositional patterns of refuse (primary vs. secondary refuse) from Smiling Dan. These data are used to determine site function/settlement type. To accomplish this goal, spatial localities which may represent domestic units are segregated within the site. The validity of this segregation is tested both functionally and chronologically. These problems must initially be examined on individual sites in order to gain a better understanding of the Middle Woodland from a regional perspective. (1)

Sasso, Robert F. and Rochelle Lurie (Northwestern) A NEW APPROACH TO THE CLASSIFICATION OF GROUNDSTONE TOOLS. Traditional methods of classifying groundstone tools have relied upon researchers' intuition. The authors question this approach. Are there classes of tools that have gone unrecognized because attribute combinations are not readily apparent? To answer this question whole tools from several components at the Koster Site were intuitively classified. Then artifact classes were generated from a number of attributes which reflect manufacture and use of groundstone tools. The two methods of classification are compared in this paper. (39)

Sattenspiel, Lisa, LuAnn Wandsnider and Henry C. Harpending (New Mexico) MODELLING HUMAN LAND USE: IMPLICATIONS FOR CULTURE CHANGE. A model is developed incorporating beliefs held by archaeologists about the relationship between man and the environment. The model includes human birth rates, death rates and rates of land degradation and renewal. The model is evaluated by analysis of stability criteria derived using standard methods of differential calculus. A comparison of the implications of these criteria with published data indicates that current assumptions about the stability of certain man/land relationships must be reexamined. (8)

Savelle, James M. (Alberta) THE NATURE OF THULE ESKIMO OCCUPATIONS IN THE BOOTHIA PENINSULA/KING WILLIAM ISLAND REGION, NORTHWEST TERRITORIES. Recent investigations on Boothia Peninsula and King William Island have resulted in evidence of substantial prehistoric Thule Eskimo occupations. Preliminary analysis suggests that subsistence/settlement strategies, oriented primarily toward caribou, seal and/or musk-oxen, may reflect attempts to maintain social patterns previously established within a predominantly bowhead whale based subsistence framework. The nature of these strategies and the implications in examining the 'decline' of Thule culture and transition to historic Inuit cultures in this area are discussed. (56)

Schelberg, John D. (National Park Service) THE DEVELOPMENT OF SOCIAL COMPLEXITY IN CHACO CANYON. The sociopolitical complexity of the Chacoan Anasazi in Chaco Canyon, New Mexico, was the result of an adaptation to a stressed environment of low productivity and low predictability. Other investigations believe that the surrounding region was populated by immigrants from the canyon during Pueblo III; however, many of the known Chacoan outlying communities show *in situ* growth beginning 550 years earlier. The kind of relationship between the canyon and the region and the level of complexity will be considered. Rather than complexity appearing in Pueblo III as a qualitatively different phenomenon, it is argued that the earliest agricultural population was more complex than previously suspected and that the transition from Basketmaker to Pueblo was one of degree rather than kind. (23)

Schenck, Helen (MASCA) METALLURGICAL ANALYSIS OF IRON FROM CATOCTIN, MARYLAND. Many iron producing and working sites in this country have been investigated archaeologically, but at few of these have the products, waste and finished, been subjected to the kinds of metallurgical analyses that would discover their composition and the manufacturing techniques by which they were created. Answering these questions would enable the archaeologist to draw important conclusions about the technological processes going on at the site as well as the efficiency of the manufacturer. The Museum Applied Science Center for Archaeology at the University Museum, Philadelphia, has undertaken a program of such metallurgical analyses on slag, casting waste and finished cast iron artifacts from the early 19th century iron working complex at Catoctin, Maryland. This paper presents the results of those analyses. (27)

Schiffer, Michael B. and Randall H. McGuire (Arizona) THE DETERMINANTS OF ARCHITECTURAL DESIGN: A GENERAL FORMULATION. This paper introduces a general model that can be used to assess the factors responsible for determining the basic characteristics of an artifact's design. A specific variant of this model is developed that is suitable for the analysis of architectural forms. The transition of domestic architecture in the prehistoric American Southwest, from pithouse to masonry pueblo, is examined in light of the general discussions and the model. (4)

Schneider, Fred (North Dakota) AN INTERPRETATION OF PALEOINDIAN CULTURES IN NORTH DAKOTA. Recent investigations of Paleoindian sites and artifacts in North Dakota indicate the presence of a wide range of projectile point types ranging from Clovis through those of the Cody Complex. There are no excavated Paleoindian artifacts in North Dakota, no known associations of these artifacts with extinct fauna and no radiocarbon dates or stratigraphic associations of these materials. All artifacts are from surface collections. Despite these shortcomings, analysis of the distribution of these artifacts indicates a concentration west of the Missouri Coteau and substantiates a regional model of the distribution and spread of Paleoindian cultures to the north and east. (53)

Schoenberg, Kenneth M. (National Park Service) THE ARCHAEOLOGY OF KURUPA LAKE. As a result of a survey of the Kurupa Lake Region, central Brooks Range, over 50 sites were discovered. The sites appear to represent cultural traditions from the American Paleoeartic up to the Historic period. A second field season spent at KIR-124, a multi component site located at the south end of Kurupa Lake, revealed a classic Denbigh component, as well as an Historic and an Arctic Tundra Tradition component. Several side-notched points indicate the presence of the Northern Archaic Tradition. The second season's work suggested the possibility that this site represents a Natvakruak complex such as described by Campbell from the Anktuvuk Pass area. (28)

Schreiber, Katharina J. (Arizona State Museum) CHANGING SETTLEMENT PATTERNS IN THE SOUTH CENTRAL HIGHLANDS OF PERU. Results of the 1981 settlement pattern study of the Carahuarazo Valley of the south central highlands of Peru are presented. From its initial occupation at the end of the Early Horizon, through the Colonial period, a number of shifts occurred in settlement location, the most dramatic during the Middle Horizon. It is suggested that this shift was correlated with, but not necessarily caused by, the expansion of the Huari state. Differences between Huari and Inca occupations of the region are evident, suggesting that their political and economic organizations might have been quite different in nature. (46)

Schuldenrein, Joseph (Commonwealth Associates) GEOARCHAEOLOGICAL INVESTIGATIONS AT RUCKER'S BOTTOM, A MULTICOMPONENT SITE AT THE RICHARD B. RUSSELL RESERVOIR, GEORGIA. Prehistoric and paleoenvironmental investigations at the Rucker's Bottom site on the Savannah River (Georgia) have been underway since 1980. Preliminary results have disclosed a succession of prehistoric occupations ranging from Paleoindian through Mississippian times. The paleoenvironmental studies have been keyed towards reconstructions of the floodplain microenvironments that prevailed during each period. Geoarchaeological methods have identified sedimentary and pedogenic intervals that are associated with particular landforms. Reconstructions were integrated with faunal, ethnobotanical, and palynological data bases to develop a model for differential utilization of the floodplain microenvironment. (47)

Sciulli, P. W. (Ohio State) HUMAN REMAINS FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Human remains from Meadowcroft Rockshelter (36WH297) are rare and include only one possible interment and 32 isolated occurrences of individual bones, bone fragments or teeth. All human material, with two exceptions, is confined to Stratum IIb or above. Currently, these two specimens represent the earliest well dated human remains in the Northeast. The osteological remains are noteworthy in their lack of major variations and pathologies. The only case of a well defined bone pathology (FS 81-1), porotic hyperostosis, appears to be fairly common in an intensively studied Late Woodland population (Mensforth et al. 1978). The teeth recovered from Meadowcroft Rockshelter are perhaps most notable for their lack of major pathologies and variations (if attrition is considered a natural biological process). Neither caries nor abnormalities in tooth size or shape are present in the sample. While relatively little comparative data is present for the root analysis, the present sample again shows little variation from the norm (Kovacs 1971). (45)

Scollar, Irwin (Rheinisches Landesmuseum, Bonn, Germany) GEOPHYSICAL PROSPECTING AND REMOTE SENSING: NATURAL AND TECHNICAL LIMITS FOR ARCHAEOLOGY (S.A.S. Special lecture). Various geophysical and remote sensing techniques are available for obtaining information about subsurface features of archaeological sites. These methods include magnetic and resistivity prospecting, thermal sensing and air photography and image enhancement of the data. These various techniques will be discussed in terms of the potential peculiar to each mound as well as the limits imposed by natural attributes of soils and features, and technical limits of the methods. (24)

Sebastian, Lynne (see Graham, Martha) (4)

Seme, Michele (Southern Illinois) MEASURING HUNTING SELECTIVITY IN AN ARCHAEOLOGICAL CONTEXT: AN EXAMPLE FROM BLACK MESA, ARIZONA. Quantitative evaluations of hunting selectivity in prehistoric subsistence systems can produce inadequate or questionable results since information loss in a biological record is generally not controlled for. As an alternative method of inference, a culture-free qualitative model of hunting selectivity is proposed. The model is constructed using data from extant hunter-gatherers in arid southern Africa. The model is tested in an archaeological context with the data from prehistoric sites on Black Mesa, Arizona. (44)

Shafer, Harry J. (Texas A&M) ECONOMIC CONSIDERATIONS OF LOWLAND MAYA CHERT TOOL INDUSTRIES. Recent archaeological work in northern Belize has identified the presence of lithic craft specialization and mass production of chert tools beginning in the Late Preclassic Period. Data derived from the investigations of chert workshops at Colha, Kunahmul and Chicawate, all located in the chert bearing zone of northern Belize, are reviewed to illustrate the structure and production systems of formal utilitarian tools. An examination of the lithic assemblages at Cuello, Kichpanha, Kokeal and Cerros reveal that these settlements were receiving the products from the Colha area industries in the Late Preclassic and Classic periods. The social mechanisms which served to structure and distribute the chert tools are discussed. (3)

Shafer, Harry J. (see Gibson, Eric C.) (51)

Sheets, Payson D. and David L. Bathgate (Colorado) RITUAL AND UTILITARIAN ASPECTS OF THE CHIPPED STONE ARTIFACTS FROM THE SACRED CENOTE AT CHICHEN ITZÁ. Despite the collection's limited size, ongoing analyses permit inferences in such diverse areas as: trade, cosmology, ritual, acculturation and extractive resource technology. Extensive pyroclastic damage exhibited by many artifacts implies ritual burning and subsequent immersion in water. Local materials, as well as exotic obsidian from as far away as Pachuca were used and deposited. The effects of a Central Mexican presence on indigenous Maya lithics production are evident and the preservation of original hafting gum on numerous implements is attributed to their deposition in an aquatic medium. (17)

Shennan, Stephen J. (Southampton) INTERACTION AND CHANGE IN THIRD MILLENNIUM BC EUROPE. There is much evidence for social change in Europe in the later third millennium. Childé explained these developments as a result of diffusion from the east Mediterranean civilizations, while Renfrew has argued that they are the result of autonomous local developments. Neither framework seems satisfactory to account for the convergence of a number of widely separated and initially very different regional trajectories which occurred at this time and which resulted in the appearance of hierarchies of a similar degree of complexity operating in similar ways. The paper explores the extent to which concepts of interregional interaction can be explanatory of change in this context. (36)

Shennan, Stephen (see Shennan, Susan) (2)

Shennan, Susan and Shennan, Stephen (Southampton) THE DEVELOPMENT OF COMPLEX SOCIETY IN PREHISTORIC EUROPE. Given the considerable progress which has been made in the theoretical understanding of states, it is a particular problem that the standard evolutionary sequence from simple to complex society does not seem especially relevant to prehistoric Europe. This paper will focus mainly on the third millennium and late second millennium BC with particular reference to the nature of the power base and sociopolitical integration at the time. This in turn leads to questions about the existence of particular types of institutions and status positions. The relation of these constructs to archaeological evidence is also addressed. Discussion of this will also include the important question of interregional differences and the reasons for them. (2)

Shimada, Izumi and Carlos G. Elera (Princeton) STYLISTIC INTERACTION AND SYNCRETISM DURING THE MIDDLE HORIZON IN NORTH PERU. An historical and processual characterization of the problematical Middle Horizon in North Peru is presented based on data from excavations in Batán Grande and concomitant ceramic analyses conducted during the past four years. During AD 600-850 we see complex permutations of the styles and associated ideologies of the contemporaneous Wari, Pachacamac and Cajamarca cultures against the background of a Mochicoid local tradition. Out of this syncretism and stylistic interaction the three coevolving styles of Lambayeque, *paletuada* and "Coastal Cajamarca" emerged. This paper further considers the roles of the Cajamarca and Pachacamac cultures in these developments. (46)

Shive, James J. (Georgia Power) THE NEEDS OF INDUSTRY. The archaeologist who works for an industry requiring the services of other archaeologists comes to view archaeology both as an end in itself and as a means of reaching the goals and objectives of the industry. This does not mean that such an individual ceases to be an archaeologist and, indeed, is in a position to be a strong advocate for archaeology. In order to pursue this advocacy role, it is important to have the support and understanding of the archaeological profession. This paper will consider the future of archaeology as it is developing in partnership with various industries that now require the services of archaeologists. (41)

Shutler, Richard, Jr. (Simon Fraser) DATING THE PEOPLING OF NORTH AMERICA. This paper proposes a model that attempts to demonstrate that there is unequivocal, conclusive proof that there were people in the New World before 12,000 BP, certainly by 20,000 BP, probably by 30,000 BP, and possibly by 50,000 BP, with diminishing degrees of confidence. The diagnostic criteria are: (1) clearly demonstrated and correctly interpreted stratigraphy, (2) multiple radiocarbon dates collected under rigorously controlled conditions and (3) artifacts of indisputable human manufacture in demonstrable association with radiocarbon dated material. Using these three criteria, several sites in North and South America are used as examples to illustrate the model. (19)

Silver, Constance S. (Columbia) ROCK ART AS ART: AN APPROACH TO A DIFFICULT CONSERVATION PROBLEM. Rock art, pictographs and petroglyphs, are one of the most important cultural resources in the U.S. However, rock art has rarely received the care and treatment applied to other artistic works, and as a result, the correct procedural approaches to rock art conservation have not often been followed. Rock art presents three major problems for conservators: (1) deterioration of stone, (2) deterioration of delicate pigment layers in pictographs and (3) exposure to the elements. Continuing research and pilot treatments involved an interdisciplinary group of conservators, cultural resource managers and scientists in efforts to halt deterioration, restore damaged art and preserve the art for as long as possible. The wide range of situations in which rock art is found in the United States means that a national interdisciplinary conference between conservators, cultural resource managers and scientists is now needed if a valuable resource is not to be lost. (54)

Smek, Jan F. and Roy R. Larick (Binghamton) THE RECOGNITION OF MULTIPLE SPATIAL PATTERNS: A CASE STUDY FROM THE FRENCH PALEOLITHIC. Spatial analysis of archaeological data requires pattern recognition techniques that manage very large numbers of points while

identifying patterns that can be related to ranges of complex site formation processes. An analytic procedure designed to address these problems is illustrated. A K-means clustering algorithm is applied to data from the Upper Paleolithic site Pincevent 36 as a data reduction technique. Multiple scales of patterning are defined, and these are compared to the results presented by the excavators. Encouraging correspondence is achieved at certain levels of clustering, while other patterns are detected which refine and expand the original interpretations. (8)

Simmons, Alan H. (Kansas) ARCHAIC ADAPTIVE STRATEGIES AND EARLY HORTICULTURE IN THE CHACO CANYON REGION. Recent excavations at Archaic sites near Chaco Canyon have revealed evidence for the use of maize by the early second millennium BC. The sites containing this evidence did not significantly vary from other Archaic sites in which a more traditional Archaic adaptive pattern of hunting and collecting was suggested. Rather, maize appears to have been a supplemental, albeit important, resource that allowed year round occupation of the greater Chaco Canyon region. The implications of these data for our understanding of the development of agricultural strategies in the Southwest is discussed. (25)

Simpson, Kay (Arizona) LINEAR LOCATIONAL MODELS FOR A MIDDLE EUPHRATES REGIONAL SYSTEM. Previous attempts by archaeologists to use locational models ignore elongated physiographic areas where settlements are aligned linearly. Linear nearest neighbor analysis is used to assess spatial relationships of sites located in a portion of the Middle Euphrates River basin. Hypotheses of changing port and river functions over time are examined. Spacing intervals of major ports are investigated, as well as why larger river towns are often located on a particular side of the river. (9)

Singley, Kate (South Carolina) COST-EFFICIENT FIELD CONSERVATION. The conservation of artifacts in the field need not be too expensive. Necessary stabilization and consolidation of artifacts can begin in the field or in the field laboratory without adding much cost to the project, and with the security of preserving materials for future analysis and study. Even such sturdy artifacts as lithics and most ceramics need to be treated with care because of potential damage which may affect the kind of analysis which can be done. Some effective and inexpensive field treatments include proper packaging for transport from the site to the laboratory and from the laboratory to the curation facility, reconstruction when necessary, chemical stabilization, cleaning and treatment for long term preservation. (54)

Sires, Earl (Arizona State Museum) HOHOKAM ARCHITECTURAL VARIABILITY AND SITE STRUCTURE IN SOUTH CENTRAL ARIZONA. The study of Hohokam architecture has primarily been oriented towards the investigation of individual architectural units and their relationship to a series of phase-specific structure types. Data from habitation sites excavated during the Salt-Gila Aqueduct Project in conjunction with information from previously excavated Hohokam sites indicates that this variability can be explained by a variety of factors such as environmental situation and structure function in addition to chronological placement. The present study has resulted in the recognition of aspects of village composition and complexity relevant to a consideration of the evolution of Hohokam social organization. (5)

Skirboll, E. (Pittsburgh) ANALYSIS OF CONSTANT VOLUME SAMPLES FROM MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. In addition to conventional dry and wet screening procedures, the Meadowcroft/Cross Creek Archaeological Project employed constant volume sampling to insure recovery of a representative array of artifacts and "ecofacts" which would pass through 1/4" dry screens or 1/8" wet screens. A constant volume sample of sediment measuring 2900 cc was taken from each natural stratum, microstratum or arbitrary 5 cm or 10 cm level within a natural stratum from every excavated square at Meadowcroft. These samples were then subjected to flotation either in a water medium (in the case of non-feature fill) or in hydrogen peroxide (in the case of feature fill or any constant volume sample of Paleoindian ascription). The procedures employed in the separation, weighing, measurement and interpretation of the constant volume samples are detailed, and some of the results of these analyses are discussed. (45)

Slaughter, Dale C. (Wisconsin) SIRAAGRUK: WHALERS AND CULTURAL CHANGE IN LATE 19TH CENTURY NORTHERN ALASKA. Siraagruk is a late 19th century Eskimo settlement located on the shores of the Chukchi Sea in extreme northwestern Alaska. The purpose of this study is to evaluate the impact of intensive Euroamerican commercial whaling activities on Eskimo subsistence practices and technologies. By using a variety of data sources, including archaeological, ethnological, field collected ethnographic, shipping records and travelers' accounts, a more comprehensive view of the intensity and direction of culture change can be provided than has heretofore been possible. Finally, the implications of a quantitative approach to the study of technological change is explored. (28)

Smith, Charles R. (see Lange, Frederick W.) (7)

Smith, Cheryl A. (Corps of Engineers) COMPETITIVE BID PROCUREMENT OF ARCHAEOLOGICAL SERVICES. Federal contracting for professional archaeological services has resulted in a large number of universities and consulting firms competing for "archaeology business." This competition is heightened by the competitive bid procurement procedure being used by many Corps of Engineers districts today. Although the procedure produces the least amount of risk to the Government, the effect on the discipline may be less than desirable. Building flexibility into the Scopes of Work and close coordination between the Government and the contractor is critical. (29)

Smith, Fred H. (Tennessee-Knoxville) CRANIOFACIAL MORPHOLOGY AND THE ARCHAIC-MODERN *HOMO SAPIENS* TRANSITION IN EUROPE. The differences in craniofacial morphology between archaic and modern *Homo sapiens* may be logically related to the maintenance of an adaptive complex facilitating extensive loading of the anterior dentition in archaic *H. sapiens*. The craniofacial characteristics of modern *H. sapiens* can be viewed as the result of selective trends which take precedence upon reduction of this adaptive necessity. Technological factors associated with the Middle and Upper Paleolithic are most likely responsible for this reduction. Finally it is reasonable to believe that the origins of modern *H. sapiens* in Europe was an essentially indigenous phenomenon. (6)

Smith, G. A. (see Michels, J. S.) (24)

Smith, Michael E. (Illinois) POSTCLASSIC SETTLEMENT PATTERNS IN WESTERN MORELOS, MEXICO. Application of a new stratigraphically derived Postclassic ceramic chronology to surface collections from the Rio Chalma reconnaissance project provides information on changes in settlement patterns from AD 900 to 1520 in western Morelos, Mexico. This paper presents data on site locations and correlations between site placement and physiographic and agricultural variables through time. General trends in population dynamics, agricultural productivity and socioeconomic organization are inferred and discussed. Comparisons with Postclassic evolution in the adjacent Basin of Mexico reveal similar demographic profiles in the face of divergent sociopolitical development; these patterns are briefly explored. (42)

Smith, Timothy A. (SUNY-Binghamton) SPATIAL AND LITHIC ANALYSIS OF THE DRY CREEK SITE, A 10,000-YEAR-OLD CAMP IN CENTRAL ALASKA. The Dry Creek site is located in the northern foothills of the Alaska Range. It is on a high bluff overlooking a major river valley. The site contains three stratified archaeological components dating to about 11,100, 10,700, and 4,000 radiocarbon years BP. Of the 35,000 items recovered, 95% are flakes. The flakes were sorted into groups that come from single cobbles. These groups, when mapped, are highly clustered and constitute "flaking events" produced by single individuals. Analysis of flake attributes within and between flaking events indicates that individual knappers can be identified. (53)

Soffer, Olga (CUNY) THE POLITICS OF THE PALEOLITHIC IN THE U.S.S.R.: A CASE OF PARADIGMS LOST. Soviet Paleolithic archaeology today is best understood as a set of archaeological characters in search of a theory author. Rigid unilineal evolutionary schemes and periodizations which ruled from the 1920s to the 1960s have all but collapsed under the stubborn onslaught of contradictory archaeological data. As a result, archaeological methods are employed in the formulation of lower to lower-middle range theory at best as well as to illustrate the "culture-historic process." The paper also discusses the organization of archaeological research in the U.S.S.R. (31)

Spath, Carl D. (Larson-Tibesar Associates) THE FORGOTTEN SEA TRADERS OF LA PUNÁ, ECUADOR. Early Spanish accounts indicate that at the time of the Conquest the Punáes of La Puná area of the Guayas estuary were influential middlemen and long distance sea traders who were granted the title of "Indians of the Royal Crown" because the Spanish recognized their strategic importance in maintaining essential commercial networks in northwest South America. The development of these networks in prehistoric times provided bridges between the blossoming civilizations of Mesoamerica and the Andes. We cannot properly understand the emergence of these two complex aboriginal civilizations without an appreciation of the maritime skills of the peoples of the Ecuadorian littoral. (30)

Spence, Michael W. (Western Ontario) THE ORGANIZATION OF OBSIDIAN PRODUCTION IN TEOTIHUACAN. A review of Teotihuacan obsidian workshop identifications, applying more stringent criteria, has led to a considerable reduction in their number. Despite this, there can be no doubt that the specialized production of obsidian artifacts was a major element of the city's economy. The distribution and nature of the workshops will be discussed and their role in the social and economic structure of the city evaluated. (42)

Spencer-Wood, Suzanne M. (U. Mass.-Boston) ARCHAEOLOGICAL TESTS OF AN URBAN SOCIOECONOMIC MODEL. Data excavated from four Quincy, Massachusetts house sites dating from the second half of the 19th century are being used to test socioeconomic correlations established for the city in the decade 1870-80. Data on consumption patterns, particularly the value of status items, was correlated with federal census schedule data on family socioeconomic status, especially occupations. A significant average difference in the value of inventories and status items was found for the occupational categories of proprietors, farmers, craftsmen and laborers. Because the archaeological sites were inhabited by people in different occupational categories they can be used to test the documentary model. (32)

Speth, John (see Wills, Wirt) (25)

Spickard, Lynda E. (SUNY-Binghamton) ORIGIN OF ANDEAN STATE ADMINISTRATIVE ARCHITECTURE. Administrative architecture characteristic of the Andean state appears to have developed at Huari, Peru during the early Middle Horizon. Similar architectural complexes have been described at Pikillaqta, Viracochapampa, Jargampata, Jincamocco and Azangaro. What are the Ayacucho Valley antecedents of Huari-style administrative architecture? Is there evidence of architectural diffusion from the Ayacucho Valley before the Middle Horizon? Recent excavations at Huari have revealed architectural remains dating to Early Horizon, Early Intermediate and Middle Horizon Periods. Development of architectural features from individual residential units to state administrative installation is discussed. Continuity of domestic architectural features and qualitative change in ceremonial architecture are examined. (46)

Spielmann, Katherine A. (Michigan) THE ROLE OF SUBSISTENCE EXCHANGE IN LATE PREHISTORIC SOUTHERN PLAINS HUNTER-GATHERER ADAPTATIONS. Annual exchange of subsistence resources between Southern Plains hunter-gatherers and Puebloan horticulturalists was observed at the time of Spanish entry into the Southwest. An ecological model developed to predict the conditions under which such exchange would have become a viable subsistence strategy for these populations is tested using a computer simulation. The simulation models late prehistoric fall bison procurement by hunter-gatherers occupying the Texas Panhandle, corn production at Pecos Pueblo, New Mexico and subsistence resource exchange between these two groups under varying environmental regimes. (53)

Spies, Arthur (Maine Historic Preservation Commission) ARCTIC GARBAGE AND NEW ENGLAND PALEOINDIANS: THE SINGLE OCCUPATION OPTION. Recurrent regularities in locus distribution, size and locus lithic count at the three major New England Paleoindian sites call for explanation. An examination of caribou hunter ethnography shows that very large seasonal gatherings of people can be supported primarily by caribou hunting in certain circumstances. A consideration of the number of stone tools produced per man-day of occupation by certain "high tech" arctic/subarctic hunting groups, coupled with the above considerations, indicates that the three major Paleoindian sites could represent single seasonal occupations by large groups of people, or a very limited number of closely spaced large-group reoccupations. (35)

Spies, Arthur (see Gerlach, S. Craig) (28)

Stafford, Barbara D. (see Sant, Mark B.) (1)

Stafford, C. Russell (Center for American Archeology) SITE STRUCTURE AND FORMATION PROCESSES AT AN EARLY MIDDLE ARCHAIC OCCUPATION IN THE LOWER ILLINOIS VALLEY. Recent contract excavations at Campbell Hollow site, a deeply buried early Middle Archaic occupation in the Lower Illinois Valley, provides an opportunity to study a number of problems concerning site formation processes. The central focus of the paper is on the relationship between site structure, patterns of refuse disposal and the integration of these structural properties with site function and models of mobility among early to mid-Holocene hunter-gatherers. The analysis of the spatial structure of the site is carried out at two levels. First, a formal descriptive analysis (mapping and statistical) of the point provenienced data is made. Second, results are used to discriminate among categories of refuse. The type of spatial organization is then used to evaluate alternatively hypothesized patterns of mobility among hunter-gatherer groups inhabiting the region. (1)

Staley, Preston S. (Illinois) and Thomas G. Wynn (Colorado) A COMPARISON OF TWO METHODS FOR MEASURING PLAN FORM VARIATION IN ACHEULEAN ASSEMBLAGES. This study compares two attribute systems that describe plan form variation in Acheulean assemblages. Both sets of attributes are applied to handaxes and cleavers from four assemblages that were excavated at Isimila, Tanzania. Comparisons between the two attribute sets, using numerical taxonomy, multidimensional scaling and discriminant function analyses reveal a clear superiority of one set, based on a series of polar coordinates, over the other. Interpretations based on both methods, and discussion

regarding the disparity between the two resulting sets of interpretations on research conclusions will be provided. (49)

Staski, Edward (Arizona) JUST WHAT CAN A 19TH CENTURY BOTTLE TELL YOU? ARCHAEOLOGICAL INTERPRETATIONS OF URBAN DRINKING BEHAVIOR. The role of alcoholic beverages among several urban ethnic groups in the United States during the 19th century is considered. Historical and archaeological data are complementary sources of information, which together allow a better understanding of how actual and perceived drinking behaviors related to general ethnic dynamics and overall social relationships in the 19th century city. "Le Projet du Garbage" of the University of Arizona's Department of Anthropology provides valuable control data that allow the full potential of archaeological investigations to be realized. (32)

Steele, D. Gentry (Texas A & M) PATTERNS OF HUMAN PREDATION. A large body of research has been published on human predator/prey relationships with bison and caribou and Forbes has documented that communal hunting is a world wide phenomenon affecting man's relationship with many other species. This paper will expand upon Forbes work by: (1) distinguishing between communal hunting and mass killing, (2) emphasizing the distinctiveness of mass killing by humans, (3) discussing relationships between prey behavior and hunting patterns and (4) examining the significance of mass killing as it acts as a natural selective agent on prey species. (53)

Stein, Julie K. (Washington) INTERPRETING SEDIMENTS IN CULTURAL SETTINGS. Archaeologists often attempt to reconstruct the natural environment surrounding their sites. They generally restrict their investigations to the vegetation, fauna and geomorphology of the past regional setting. Few researchers realize that the physical setting within a site may also be examined. The archaeological deposits contain abundant clues of the cultural activities responsible for the construction and modification of a site. To discern these activities one must closely examine the matrix of the site according to the principles of sedimentation. The principles state that sediments result from the interplay of four factors: (1) source, (2) transportation mechanism, (3) environment of deposition and (4) postdepositional changes that alter the original character of the sediment. (50)

Stephens, Jeanette E. (Southern Illinois) THE LOCATIONAL EFFICIENCY OF FACILITIES AT ARCHAEOLOGICAL SITES. Spacing behavior is observed indirectly in the physical arrangement of structures and other facilities at archaeological sites. Facility location has been suggested to result from decisions concerning efficiency. Models of spatial optimization provide a means to assess the role of locational efficiency in producing observed spatial patterns. Spatial optimization can be tested by using geographical techniques, such as the ALLOC V procedure, designed to determine the optimal location of facilities. Also, the accessibility of individual features can be measured by the "degree of circuitry" index. An examination of locational efficiency is presented in reference to Middle Mississippian data. (21)

Stern, Richard O. (Alaska Office of History & Archaeology) CULTURAL RESOURCE INVESTIGATIONS IN NORTHWESTERN ALASKA. Since the establishment of the Office of History & Archaeology within the Alaska Division of Parks in 1971, personnel from the office have conducted over 150 cultural resource surveys in advance of state funded construction projects. Results from these surveys have been the discovery and evaluation of previously unknown prehistoric and historic sites, and the mitigation of project impacts on those sites. A research design which incorporates presently known ethnographic, archaeological and environmental data is being prepared in order to develop a predictive model for future surveys. (28)

Sternberg, Robert S. (see McGuire, Randall H.) (47)

Stevenson, Joy (Central Missouri State) INTENSIVE UTILIZATION OF SPACE AT A MULTICOMPONENT SITE IN SOUTHWESTERN COLORADO. Excavations conducted intermittently in the Yellow Jacket area of southwestern Colorado from 1953 to 1981 have revealed a complex of multi-component sites occupied by the Basketmaker III period, in early and late Pueblo II and in early Pueblo III times. Typical of this pattern is the House I area of 5MT3. Excavations within unit quadrants are controlled by the natural stratigraphy of the site. Aligned profiles are established for the east-west and north-south axes of all units. Occupational sequences are defined and architectural relationships investigated. Mylar overlays reveal the intensive reuse of this area less than 400 square meters in size. (21)

Stocker, T. (see Muse, Michael C.) (49)

Story, Dee Ann (Texas) THE MANAGEMENT AND MAINTENANCE OF ARCHAEOLOGICAL COLLECTIONS: AN EXAMPLE. A primary function of the Texas Archaeological Research Laboratory, The University of Texas at Austin, is the long term curation of numerous continually expanding

collections of archaeological records and specimens. The management and maintenance of these collections has emphasized University oriented missions of research and training, and has sought cost-effective solutions to curation and conservation problems. These strategies have resulted in very active use of the collections which, in turn, has led to an increase in support from the University. (54)

Stothert, Karen E. (Texas, San Antonio) TRADITIONAL ALBARRADAS AND ANCIENT WATER CONTROL ON THE SANTA ELENA PENINSULA, ECUADOR. Hundreds of *albarradas*, which are large earthen constructions that collect and retain rain water, were maintained by communal labor until about AD 1950 on the Peninsula. These are part of an old human adaptation to conditions of scarce seasonal rainfall. Excavations in the Albarrada of Achallan show that as early as 2,500 years ago, people identified as Engoroy constructed and used albarradas. Evidence suggests that the climate regime during much of the prehistoric period was similar to today's. (30)

Straus, Lawrence G. (New Mexico) FROM MOUSTERIAN TO MAGDALENIAN: CULTURAL EVOLUTION VIEWED FROM CANTABRIA AND GASCONY. The adaptive changes which occurred during the latter half of the Würm Glacial can best be characterized and explained by first contrasting evidence from the Mousterian and Magdalenian polar extremes of this period. This paper examines in detail the evidence for substantive differences in technology, settlement pattern, subsistence practices, social organization and cultural expression between these two extremes in the southern sector of the Franco-Cantabrian region. No abrupt breaks are seen in tracing the trajectory of cultural change during the intervening period which spans the Aurignaco-Perigordian and Solutrean culture-stratigraphic units in this well studied region. The ultimate causal roles of environmental fluctuation and human population growth are explored and evaluated. (6)

Struever, Stuart (Northwestern) THE ILLINOIS VALLEY ARCHAEOLOGICAL PROGRAM: AN HISTORICAL OVERVIEW. Beginning in 1964, a group of archaeologists and related specialists from Northwestern University and other institutions began a long range, regional research program within a 40 x 70 mile area centered on the Illinois Valley just north of St. Louis and headquartered at Kampsville, Illinois. This paper presents an overview of the concepts underlying the original establishment of the Illinois Valley Archeological Program. It will evaluate the degree to which these concepts have been carried out in actual research during the intervening 17 years. An attempt will be made to identify causes for shifts in focus within the program over the years, attempting to relate these to broader forces operating within the discipline of American archaeology and within American society. (1)

Stuckenrath, R. (Smithsonian), J. M. Adovasio (Pittsburgh), J. Donahue (Pittsburgh) THE STRATIGRAPHY, CULTURAL FEATURES AND CHRONOLOGY AT MEADOWCROFT ROCKSHELTER, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. Eleven natural strata of widely varying thickness, composition, texture and depositional characteristics have been distinguished at Meadowcroft Rockshelter (36WH297) and are assigned numerical designations beginning with the earliest stratum (I) and proceeding to the latest (XI). All but the deepest of these strata have produced cultural features. Charcoal samples from 98 of these features as well as two samples from basketry fragments were submitted for radiocarbon assay. Seventy of these samples have been processed of which 22 were too small to count. The results of the remaining 48 assays indicate that the initial occupation of the rockshelter is ascribable to the fifteenth millennium BC, while the latest radiocarbon assay on historic material is AD 1775 ± 50. Currently, Meadowcroft represents the longest human occupational sequence in eastern North America. As various objections to the Meadowcroft radiocarbon dates have been voiced, particular attention is devoted to refuting these observations. (45)

Styles, Thomas R. (see Hajic, Edwin R.) (1)

Surovik-Bohnert, Margo (BLM) COLLECTIONS MANAGEMENT FOR THE DOLORES ARCHAEOLOGICAL PROJECT. The Dolores Archaeological Project is a large scale mitigation program. The resulting collection and records will be used for both research and interpretation to the public. A museum, the Anasazi Heritage Center, is being built by the Bureau of Reclamation. It will be staffed and managed by BLM, and will house the DAP collection and other government collections from the San Juan Anasazi area. At DAP our concern was to develop a system which would accommodate ongoing research and analysis, and incorporate good collection management procedures. We also needed to consider interpretive and conservation needs as well as have a system which would be readily transferable to a museum situation and adaptive enough to use with other future collections. (54)

Sutro, Livingston D. and Theodore E. Downing (Arizona) ZAPOTEC DOMESTIC SPACE: A DIACHRONIC ETHNOARCHAEOLOGICAL ANALYSIS. Most ethnoarchaeological research is synchronic and functional. A diachronic, processual study of change in the structures and

features of ninety-two *solares* (tofts) in a Oaxacan peasant village over the last 17 years was recently attempted using a remapping and questionnaire procedure. Seven factors influential in change are identified along with their material consequences and the possibility of their detection in the archaeological record. Consideration is also given to changes through time in per capita roofed dwelling area demonstrating that in the Zapotec case this ratio will change according to the number of married pairs present in the *solar*. (21)

Swedlund, Alan C. (see Martin, Debra L.) (44)

Szuter, Christine (Arizona State Museum) IDENTIFYING FOOD REMAINS IN PREHISTORIC RODENT ASSEMBLAGES. The various approaches to faunal analysis emphasize large game animals. Methods used to determine cultural versus noncultural bone rarely focus on smaller animals, particularly rodents. Generally rodents are viewed as agents affecting archaeological faunal assemblages based on the assumption that they are intrusive, but rarely are they viewed as a result of human activity. A model, based on taphonomic and ethnographic data, is presented as a means of attempting to distinguish noncultural (or intrusive) rodents from rodents that may have been used as food items in Hohokam society. (5)

Tainter, Joseph A. (Forest Service) SOCIAL COLLAPSE AS A NATIONAL ARCHAEOLOGICAL RESEARCH TOPIC. The collapse of complex social systems presents one of the more enigmatic occurrences of history, violating as it does the general pattern of increasing complexity through time. It is a topic of indisputable concern to contemporary societies and merits consideration as a National Archaeological Research Topic. This paper defines the scope of the topic and describes examples from North American prehistory. Flaws in ad hoc explanations of the phenomenon are outlined. Principles that may contribute to a general theory of social collapse are developed and the roles of historical versus universal factors in understanding collapse are explored. (33)

Taschek, Jennifer T. (Wisconsin) SPECIALIZED PRECOLUMBIAN OFFERTORY ACTIVITIES AT CENOTE XLAHAH, DZIBILCHALTUN. Nonceramic artifactual materials recovered from Cenote Xlahah, Dzibilchaltun are considered evidence of its Late-Terminal Classic utilization for specialized offertory practices. The private rather than public nature of these rituals is suggested by the character of artifacts recovered from the cenote and the intrasite distribution of similar pieces. Their redundancy and quality suggest a single, specialized ceremony participated in by a homogeneous elite population. Typological and stylistic similarities to pieces from northwestern Campeche possibly reflect the cultural affiliation of this population. (17)

Tate, Marcia J. and Bruce E. Rippeteau (Petroleum Information Corporation) CULTURE HISTORY FROM ENERGY DEVELOPMENT. Corporate archaeology responds to needs such as western United States energy development. Such needs are not for the convenience of scientific inquiry and impose research limitations. Constraints to research imposed upon corporate archaeology include a frequently small scale of inventory, the urgency of field investigations undertaken, the lack of regional research designs to assist data gathering priorities and reluctance by energy developers to finance research not directly benefiting their programs. Despite the system's limitations, corporate archaeology contributes to knowledge of culture history. Data are being gathered now rather than being deferred for the considerably uncertain future and areas dictated for investigation are often those previously neglected by others' research interests. (40)

Teague, Lynn S. (Arizona State Museum) THE PRECLASSIC TO CLASSIC PERIOD TRANSITION IN HOHOKAM SOCIETY. The Salt-Gila Aqueduct Project provides evidence of significant complexity in Preclassic Hohokam society. Community ties and regular exchange between settlements in environmentally diverse areas provide evidence of Preclassic organization on a scale significantly greater than the single irrigation system. In combination with the local diversity in subsistence, settlement structure and style in material culture observable through SGA data, this supports greater continuity between Preclassic and Classic society than previously believed. The development of Classic Period Hohokam society as a logical outgrowth of the existing cultural system is proposed and the implications for regional change are examined. (5)

Theodoratus, Dorothea J. (see Johnson, Jerald J.) (29)

Thiel, Barbara (Northern Kentucky) RECONSTRUCTING SOUTHEAST ASIAN PREHISTORY. Culture histories are generally presented in terms of stage frameworks, but such frameworks have several inadequacies. An alternative, a developmental framework, is presented. This framework is based on a continuing interaction between environmental and cultural factors and, depending on various local conditions and cultural adaptations, results in a variety of cultural or developmental patterns. Various different cultural patterns can occur simultaneously. A

developmental framework for Southeast Asia is presented, but the same principles and type of framework are also applicable to other areas. (9)

Thompson, Kevin W. (Colorado State) ANALYSIS AND IMPLICATIONS FROM AN ARCHAIC ROCKSHELTER IN NORTH CENTRAL COLORADO. Laboratory analysis of materials recovered from Phoebe Rockshelter has shown the presence of an occupation sequence ranging from Early Plains Archaic to the late Historic Period. Debitage was subjected to established lithic reduction trajectories and the results are discussed in relation to resource exploitation and seasonal camp use. The validity of the Altithermal period as representing a cultural hiatus on the Plains will be discussed with regard to these findings. (56)

Thompson, Robert S. (Arizona) VEGETATION CHANGE AND ARCHAEOLOGY IN THE EAST CENTRAL GREAT BASIN. Subalpine conifers were present well below their modern limits in the east central Great Basin until 11,000 BP. The plant remains associated with the "Mount Moriah" occupations at Smith Creek Cave lack subalpine conifers, suggesting that these occupations postdate 11,000 BP. Woodland plants are rare in late Pleistocene plant assemblages from the Great Basin. Utah juniper migrated into the region in the early Holocene, several millennia prior to the arrival of single-needle pinyon pine. This pinyon, an important aboriginal resource, apparently did not reach the east central Great Basin until roughly 6000 BP. (19)

Thompson, Robert S. (see Martin, Paul S.) (19)

Tiedt, Glenn F. (National Park Service) EASEMENTS AND ARTIFACTS: AN ARCHAEOLOGICAL INVESTIGATION OF THE INTERNAL REVENUE CODE. The federal income tax law encourages donations to qualifying organizations for a wide variety of public purposes. A 1980 amendment to the Internal Revenue Code introduced a new concept of the "qualified conservation contribution" which provides income tax benefits to the donor of historic land areas and certified historic structures. Archaeological sites can be either, and archaeologists who understand the charitable contribution provisions of the Internal Revenue Code will recognize opportunities to protect archaeological resources through donation of land or easements. (14)

Torrence, Robin (Sheffield) TIME, EFFICIENCY AND HUNTER-GATHERER TECHNOLOGY. The role of hunter-gatherer technology as an adaptation to the need for efficient budgeting of limited time requires explicit consideration. Two major technological responses to time stress which are discussed include (1) the scheduling of procurement, manufacture and maintenance activities and (2) the structure of tool kits. In particular, predictions for assemblage structure are made in terms of the composition, diversity and complexity of artifacts. These proposals are illustrated by a cross-cultural sample of hunter-gatherer groups. (13)

Trinkaus, Erik (Harvard) BEHAVIORAL IMPLICATIONS OF HUMAN POSTCRANIAL CHANGES AT THE MIDDLE TO UPPER PALEOLITHIC TRANSITION. The Middle to Upper Paleolithic transition saw significant changes in human postcranial anatomy associated with the evolution of Neanderthals into anatomically modern humans. These postcranial alterations included a decrease in robustness, changes in thumb phalanx proportions and a reduction of pelvic aperture size. All of these anatomical changes correlate with the contemporaneous cultural changes of the Middle to Upper Paleolithic transition, but the patterns of feedback between the anatomy and cultural behaviors of these humans varied depending upon the functional complex involved. (6)

Trinkaus, Kathryn Maurer (Pennsylvania) POLITICAL ASPECTS OF STYLE AND INFORMATION IN MORTUARY RITUAL. Patterning of mortuary ritual has been shown to contain information about social structure. Burials, as archaeological remains, contain only part of this information but can be supplemented by written sources describing nonmaterial aspects of ritual. However, study of Central Asian/Iranian ossuary burial in the early first millennium AD demonstrates contradictions between archaeological and documentary sources, since the documents are artifacts of a political process which altered the role of mortuary ritual. Both codification of mortuary ritual and the range of variation of mortuary forms reflect structural changes in the societies of which they were part. (9)

Tsong, I. S. T. (see Michels, J. S.) (24)

Tsong, I. S. T. (see Nelson, C. M.) (24)

Tunnell, Curtis (Texas Historical Commission) ANALYSIS AND REPLICATION OF A PORTION OF THE FOLSOM LITHIC REDUCTION PROCESS AT THE ADAIR-STEADMAN SITE. Investigation of an extensive Folsom site in west Texas yielded an extensive lithic assemblage. Computer

manipulation of metric data from over 500 projectile points, point preforms and channel flakes has produced an excellent image of the lithic reduction process. Replication experiments involving many variables such as lithic material, annealing, knapping techniques and tool types are giving additional insights into Folsom lithic technology. (35)

Turner, B. L., II (Clark) AGRICULTURE IN NORTHERN BELIZE. Understanding of prehistoric Maya agriculture has been advanced by numerous interdisciplinary studies during the past decade. These studies indicate some of the major agrotechnologies, forms of cultivation and economic species used by the ancient Maya and suggest the broader sequences of agricultural change that took place in the region. The evidence seems to indicate a change from dryland systems of extensive (input-output) cultivation to wetland systems of intensive cultivation. By Classic times, northern Belize maintained one of the largest documented networks of wetland cultivation in Mesoamerica. Throughout the entire agricultural sequence orchard-garden type species were apparently important. (3)

Turpin, Solveig (Texas) THE ROCK ART OF SEMINOLE CANYON, TEXAS. Seminole Canyon, Texas, is in the Amistad area of the Trans-Pecos. It has been acquired as a state park to show the rock in nine of the limestone rockshelters in the area. However, the pictographs are being rapidly destroyed by natural forces in the rock and by the climate. Nevertheless, the art depicts a part of the culture of the Archaic people who inhabited and used the canyon until European contact. There are symbolic as well as realistic scenes painted on the walls of the shelters, and their importance to the understanding of the prehistoric cultures of the area is very high. (54)

Valdez, Fred, Jr. (Harvard) and Laura J. Kosakowsky (Arizona) THE CERAMICS OF NORTHERN BELIZE: CHANGING PATTERNS OF INTERACTION AND ECONOMICS. Archaeological investigations in northern Belize have produced much new information on the ceramic assemblages of the region. Economic considerations warrant a brief review of the major complexes with comparative interregional and intraregional perspectives. A study of changing economies through time, as viewed in the ceramics from the Middle Preclassic through the Postclassic, is also imperative. The interplay of the economic system(s) with political, social and religious influences is discussed. Additionally, possible economic models for the region are explored. (3)

Valdez, Fred, Jr. (see Kosakowsky, Laura J.) (51)

Vento, F. J. and J. Donahue (Pittsburgh) LITHIC RAW MATERIAL UTILIZATION AT MEADOWCROFT ROCKSHELTER AND THE CROSS CREEK DRAINAGE, WASHINGTON COUNTY, SOUTHWESTERN PENNSYLVANIA. In addition to the more or less standard typological, technomorphological and functional analyses of lithic artifacts from Meadowcroft Rockshelter (36WH297) and the Cross Creek drainage, chert raw material sources have been studied. To date, five major chert sources have been identified via petrographic thin sectioning and analysis. X-ray diffraction also has been used to determine the presence/absence of calcite and dolomite in these specimens. Cross comparisons of lithic artifacts and raw materials from the entire Cross Creek drainage are drawn to well dated lithics recovered from Meadowcroft Rockshelter itself which has provided an indispensable temporal "yardstick" for these lithological studies. Knowledge thus gained is crucial to an understanding of prehistoric trade and/or exchange and human interaction throughout the Cross Creek drainage. (45)

Vierra, Robert (see Anderson, Dana B.) (4)

Vierra, Robert (see Alter, Laura) (25)

Villa, Paola (Wyoming) GEOGRAPHIC VARIABILITY AND RAW MATERIALS IN THE ACHEULIAN OF WESTERN EUROPE. The existence of separate cultural provinces in the European Acheulian is a traditional notion held by some archaeologists but denied by others. This notion is based on unsystematic observations of differences in tool forms and technical features in assemblages from different regions. Total assemblage content and variation within the same region are not part of the argument; thus the "functional" explanation need not be directly involved. A systematic study of the archaeological materials on which these high level interpretations are based shows that the link between evidence and proposed inference is very weak. The pattern of variation is strongly dependent on the use of different raw materials and it appears to reflect not cultural variability but differences in the availability and physical properties of raw materials. (9)

Villalba, Marco (Museo, Banco Central, Quito) CENTRO CEREMONIAL—AREA RURAL, IMPLICACIONES DEL PROCESO URBANO EN EL FORMATIVO TEMPRANO DE LA COSTA ECUATORIANA. Sedentarismo, asentamiento, medio ambiente, agricultura y diferenciación social son variables que intentan describir un proceso urbano que explica una situación de adap-

tación, cambio y desarrollo cultural local, desde el Paleolítico en la costa ecuatoriana, hacia la concretización del mismo en el Formativo Temprano, evaluando las posiciones teóricas e hipótesis que intentan explicar el apareamiento de la cultura Valdivia y destacando las implicaciones económicas y sociales de la dicotomía Centro Ceremonial—Area Rural en la manipulación del control y del poder. (30)

Volkman, Phillip W. (Southern Methodist) LITHIC TECHNOLOGICAL TRANSITION FROM MIDDLE TO UPPER PALEOLITHIC IN THE LEVANT. Boker Tachtit, a site located in the Nahal Zin highlands of the Central Negev, Israel, contains four *in situ* occupation levels in primary context. Artifacts within each level reunite both by rejoining artifacts broken during occupation and by actually reconstructing cores. The reconstructions delimit the exact technological approaches to core reduction per level. The modified Levallois reduction strategy of Level 1 begins a technologically transitional sequence of reduction strategies which concludes in a primarily single platform blade technology in Level 4. This sequence challenges assumptions concerning the character of the transition and the classificatory significance of artifact attributes. (18)

Voytek, Barbara A. (UC-Berkeley) INTENSIFICATION IN THE EXPLOITATION OF NONSUBSISTENCE RESOURCES. Within the study of socioeconomic change is the study of resource exploitation through time and the ways in which individuals and societies relate to each other through the materials they manipulate. Intensification of the exploitation of a nonsubsistence or nonfood resource such as stone plays an important part in the development of socioeconomic systems and thus needs to be studied by the archaeologist. In this study, special attention is given to developments in the patterns of distribution and consumption which directly pertain to the relations between producing and consuming units. Resultant theories are tested with recent data on stone exploitation during the Neolithic in Southeast Europe. (49)

Waddell, David B. (Arkansas) SELECTION OF ATTRIBUTES FOR PREDICTIVE MODELING OF SITE LOCATION. Efficient application of multivariate logistic regression analysis in predicting site location is dependent upon development of adequate bridging arguments between data and theory for selection of site location attributes. This approach is implemented in an analysis of Caddoan settlement patterning. The structure of the cognized environment, the structure of the environment and the relationship between etic and emic variables is analyzed in the development of bridging arguments. Analysis of the accuracy of the attributes and of the error in the logistic model are conducted and suggestions are made for the reduction of specific types of error in future analyses. (37)

Walthall, John A. (IDOT) SITE PRESERVATION AND HIGHWAY ARCHAEOLOGY IN ILLINOIS. The preservation of cultural resources is the major goal of contract archaeology. A primary means of achieving this goal has been the involvement of archaeologists in early planning so that important resources can be totally avoided by construction. With agencies such as highway departments, which are construction oriented and are bound by engineering constraints, this is often not possible. An alternative approach, partial preservation coupled with data recovery in site areas to be disturbed, has been successfully employed in Illinois. Several specific examples are discussed and evaluated. (14)

Walthall, John A. (see Porter, James W.) (11)

Wandsnider, LuAnn and Lewis R. Binford (New Mexico) DISCERNING AND INTERPRETING THE STRUCTURE OF LAZARET CAVE. Lazaret Cave is a French Acheulean site of high integrity and short duration for which detailed reporting exists. With these data, its structure is analyzed using both ethnoarchaeological models and scaled multivariate techniques. The former identify those variables to be monitored while the latter inform on the values of those variables which are then considered spatially. That is, contemporary site structure studies calibrate the tool of multivariate analysis which can then measure archaeological site structure. Thus, structural similarities and anomalies between past and present are identified. Behavioral implications of the derived structure, e.g., disposal behavior of hominids, are discussed. (4)

Wandsnider, LuAnn (see Sattenspiel, Lisa) (8)

Watters, David R. (Woods Hole) MARINE RESOURCES FROM BARBUDA AND MONTSERRAT. Surrounding the physiographically distinct islands of Barbuda and Montserrat, West Indies are ecologically dissimilar estuarine and marine environments. Resources of the coastal, neritic and littoral regions of each island that were exploited by prehistoric populations indicate differential use of biotopes. Estuarine and marine faunal remains recovered from sites indicate not only the anticipated inter-island variability but also intra-island variability. The significance of marine resource utilization by prehistoric Antilleans seems to be site-specific. (10)

Webster, David and Gary Webster (Penn. State) OPTIMAL FORAGING AND PLEISTOCENE EXTINCTION. A basic assumption of the Pleistocene extinction, or "overkill" hypothesis, is that rates of human predation on numerous genera of megafauna exceeded prey replacement rates. Previous assessments of this hypothesis have often stressed the technological or organizational capabilities of Paleolithic hunters to harvest prey in sufficient numbers to threaten extinction. Optimal foraging models and ethnographic observations of modern hunters-gatherers provide a logical basis for assessing the feasibility of alternative reconstructions of Paleolithic hunting strategies as well as their compatibility with the concept of critically high rates of predation sufficient to cause extinction. (19)

Webster, Gary (see Webster, David) (19)

Wendorf, Fred (Southern Methodist) LATE PALEOLITHIC FOOD PRODUCTION ALONG THE EGYPTIAN NILE. This paper discusses the Late Paleolithic sites where numerous grains of barley, wheat, lentils, chickpeas and dates were found associated with charcoal dating between 18,300 and 17,000 BP. These discoveries have profound implication for our understanding of the processes which led to the beginning of food production. It is no longer feasible to view the beginning of food production as a response to environmental stress or as a result of demographic pressure. (18)

West, G. James (see Foster, John W.) (53)

Whalen, Michael F. (Tulsa) SETTLEMENT SYSTEM EVOLUTION IN THE QUEMADO AREA OF WEST CENTRAL NEW MEXICO. Survey data are used to characterize Pithouse and Pueblo period adaptations to the study area. Changes in these adaptive strategies are traced between the two periods (ca. AD 400-1350). Pithouse adaptations involve small, dispersed settlements scattered over a number of environmental zones. Early Pueblo settlement systems continue to be small and dispersed, although they are very specific in location near arable land. Later Pueblo settlement systems are based on large nucleated villages located exclusively in optimum farming areas of major drainages. It is argued that this nucleation represents a shift into a different mode of operation and production in order to deal with the pressures generated by population growth. (25)

Whalley, Lucy A. (Illinois) DIVERSITY IN LATE BLUFF/MISSISSIPPIAN PLANT EXPLOITATION IN THE AMERICAN BOTTOM OF ILLINOIS. Mississippian subsistence throughout the Midwest has traditionally been assumed to have been dominated by maize agriculture. This may in fact be the case, although convincing evidence has yet to be produced. Recent data from 14 Late Bluff/Mississippian components in the American Bottom of Illinois suggest that a recurring complex of domesticated, cultivated and wild plants was utilized in addition to maize. This type of adaptation develops in terminal Late Woodland times in both the adjacent uplands of the American Bottom and on the floodplain proper. This pattern will be examined in view of current models describing the Mississippian subsistence adaptation. (39)

Whatley Styles, Bonnie (Illinois State Museum), Sarah Ward Neusius (Missouri), and James R. Purdue (Illinois State Museum) THE EVOLUTION OF FAUNAL EXPLOITATION STRATEGIES: A CASE STUDY IN THE LOWER ILLINOIS VALLEY. Studies of prehistoric human faunal exploitation over the past 20 years in the lower Illinois Valley and surrounding Midwestern regions document three major changes in subsistence strategies. The first change occurs at the Paleoindian to Archaic transition and includes loss of Pleistocene megafauna and minor losses of more northern boreal elements. The second major trend involves mammal utilization during Archaic times and is marked by initial diverse usage of small-bodied animals in conjunction with white-tailed deer eventually leading to more selective utilization of larger-bodied mammals. The third major shift occurs around 7500-7000 BP when there is an explosion in aquatic exploitation at sites in major river valleys. Stimuli important to these changes vary through time but include changing climate and landscapes, developing technologies and procurement efficiency, evolving social organization, growing human populations and changing demography. (1)

Wheeler, Jane (Peabody Foundation) LAMOID DOMESTICATION AND THE EARLY DEVELOPMENT OF PASTORALISM IN THE CENTRAL PERUVIAN ANDES. Archaeozoological analysis of approximately 200,000 animal bones from Telarmachay Rockshelter has produced evidence of *in situ* lamoid domestication and the development of llama and alpaca pastoralism by 4300 BC calibrated, or 5400 ± 60 BP radiocarbon years in the Puna of Junin, Peru. Comparison of the Telarmachay faunal data with that from the nearby sites of Uchumachay, Pachamachay and Panaulauca points to the establishment of a seasonal herding round by this date. The relative importance of lamoid hunting and herding at these sites, and in the evolution of early human adaptation to the Andean highlands, is discussed. (46)

White, Everett M. (South Dakota State) A RECONSTRUCTION OF THE GEOLOGIC AND SOIL ENVIRONMENT AT THE LANGE/FERGUSON (39SH33) CLOVIS KILL SITE. The mammoth bones are in sediment that accumulated rapidly near the end of the Pleistocene. Vegetation kinds changed and soil, formed on steep badland slopes during the late Wisconsin glaciation, eroded and was deposited in the valley with the site. Black 1- to 3-mm diameter organic masses occurred in the light colored sediment associated with and capping the bones. Aggradation was rapid or the sediment would be uniformly darkened. The mottled sediment was capped by several thin CaCO₃ seams that formed when the zone was saturated with water. (34)

White, Randall (NYU) PROBABLE UPPER PALEOLITHIC KILL STRATEGIES IN THE PERIGORD: A TOPOGRAPHIC APPROACH. Based on the topographic study of 185 sites in the Perigord region of Southwestern France, a number of probable Upper Paleolithic kill strategies are outlined. It is argued that the traditional nondiscovery of kill sites is, in fact, nonrecognition. Where available, supporting faunal and assemblage data are presented. Future research designs are recommended that differ greatly from those traditionally employed in discovering and excavating Upper Paleolithic sites. (9)

White, William P. (Illinois) SPATIAL AND TEMPORAL VARIATIONS IN FLOODPLAIN GEOMORPHIC PHENOMENA AND THEIR EFFECTS ON PREHISTORIC CULTURAL DISTRIBUTIONS. Reconstruction of geomorphic environments in space and time in the American Bottom of the middle Mississippi River Valley aid archaeological interpretation of twelve prehistoric sites. These sites are associated with paleo-river channels as well as an alluvial fan and provide data on the association of geomorphic environments across a range of cultural affiliations. Analysis of Holocene fluvial development in this portion of the American Bottom demonstrates the dynamic nature and variability of stream processes in a relatively small area and plays a significant role in explaining the pattern of archaeological sites. (11)

Whittaker, John C. (Arizona) SOCIAL IMPLICATIONS OF PROJECTILE POINT VARIATION. A large collection of projectile points from the Grasshopper Ruin in east central Arizona is analyzed. The use of sets of points from the limited context of single burials allows some tests for variation due to the idiosyncracies of individual knappers. Where individual craftsmen can be identified, some conclusions about social order can be advanced. (49)

Whitten, Richard G. (South Dakota) NATURE AND FUNCTION OF CERTAIN RAISED FIELDS, GUAYAS BASIN, ECUADOR. Excavations of selected relict raised fields near Samborondon, Guayas Basin, Ecuador are summarized. Evidence for human creation and utilization of these small mounds is presented. Carbon dating of samples taken from mounds suggests major occupation and use of mounds in the 7th century AD. Material culture, although badly preserved, is related to local "Milagro" culture. From frequency of ceramic graters, it is suggested that root crops, particularly manioc, was of great importance in raised field farming. The paper examines the nature of these raised fields and suggests avenues for future research based upon these preliminary results. (30)

Whittlesey, Stephanie M. (see Reid, J. Jefferson) (21)

Wiant, Michael D. (Center for American Archeology) CHERT QUALITY, LITHIC PROCUREMENT AND MOBILITY: ARCHAIC RESOURCE SELECTION. This paper provides a model of lithic procurement strategy which is applied to Archaic period sites in Illinois. The abundance of lithic resources, resource quality, tool technology and group mobility are integrated into a model which is used to evaluate similarities and differences in chert tool and debris from Middle to Late Archaic period occupations in the Lower Illinois River valley. Of specific interest is whether or not there are differences in the quality of chert used for tool production as territory size or group mobility decreases in an environment where chert resources are generally available. Another not qualitatively equivalent consideration undertaken here is whether or not procurement and tool production strategies differ in areas where chert resources are scarce. The multicomponent Napoleon Hollow site is used as a basis for development of this model. (1)

Wiegman, P. (see Carlisle, R. C.) (45)

Wilcox, David R. (Arizona State Museum) THE SIGNIFICANCE OF HOHOKAM BALLCOURTS. Nine Hohokam ballcourts in the Phoenix Basin are examined in detail. Their history as architectural features in relation to site structure is explicated and their "choreographic" and symbolic structures are analyzed. A map of the distribution of different classes of ballcourts is then presented and the implications of these data for an understanding of the changing Hohokam regional system are inferred. The nature and extent of Mesoamerican influence on Hohokam social evolution is briefly discussed. (45)

Wilk, Richard R. (UC-Santa Cruz) **LITTLE HOUSE IN THE JUNGLE, THE CAUSES OF VARIATION IN HOUSE SIZE AMONG MODERN MAYA.** Archaeologists frequently relate differences in house size within prehistoric communities to variation in status or family size. This ethnoarchaeological study of modern Kekchi Maya houses relates the area of houses to a large number of social and economic variables, and concludes that no single variable can account for a large part of the difference. Rather than letting the lesson rest as a cautionary tale, the paper proposes that the lack of simple correlations is a key to the essential nature of social/artifactual interactions in egalitarian communities. (12)

Will, Richard T. (see Gibson, Terrance H.) (18)

Wills, Wirt, John Speth, Richard Ford (Michigan) and Austin Long (Arizona) **BAT CAVE REINVESTIGATED.** At the request of the BLM, the Museum of Anthropology is excavating and reanalyzing this famous early agricultural shelter in south central New Mexico. Although the deposits have been vandalized, an extensive paleoenvironmental horizon underlies the remnant cultural levels. Late Pleistocene beach gravels are covered by these stratified layers that are not continuous throughout the site. A primitive though not early maize is present and perishable artifacts are abundant. The cultural midden is distinctly stratified but most of it consists of interbedded pack rat nests. It is possible to correlate our excavations with previously published reports but numerous carbon-14 dates are required to interface the various cultural levels. New dates for corn and squash are presented. (25)

Windes, Thomas C. (Chaco Center) **A SECOND LOOK AT POPULATION IN CHACO CANYON.** A number of recent models dealing with the Chacoan phenomena presume a large permanent population residing in the canyon during the Classic Bonito Phase (AD 1020-1120) despite the growing evidence that local resources were inadequate to support such a population. Now there are data to suggest that town population was lower than previously envisioned, but perhaps periodically boosted by seasonal influxes of people. Furthermore, I now believe that the small site population was much less than in the preceding period. Thus, a more critical look at the timing of the population fluctuations in Chaco Canyon is necessary for a further understanding of the entire Chacoan system. (25)

Wiseman, Frederick M. (Louisiana State) **PHYTOLITH EVIDENCE FOR SWIDDEN-LIKE AGRICULTURE IN THE MAYA LOWLANDS.** Soil samples from the forests of the Maya Lowlands contain abundant and well preserved graminoid phytoliths, indicating the presence of grass in areas now covered with tropical forest. The presence of maize-like phytoliths within this assemblage implies swidden in the uplands at some time in the past. Analysis of sealed soils dating before the Middle Preclassic Period also contain maize and other grass phytoliths. The implications of these data to theories of the development and complexity of Maya agriculture are manifold. Swidden was probably an early and necessary stage in the sequence of agricultural intensification in the Maya area. (51)

Wittry, Warren L. (Illinois) **AN EARLY LATE WOODLAND MORTUARY SITE.** The Holdener Site (11-S-685) was located on the loess bluff overlooking the American Bottom. This barrow pit site was totally excavated and is dated by ceramics and radiocarbon to the early Late Woodland Period. The site is interpreted as mortuary, containing two unique burial platforms, possibly indicating a dual social division. The site plan and principles of "truss trenches" will be elucidated. (11)

Wobst, H. Martin and Arthur S. Keene (Massachusetts) **ARCHAEOLOGICAL EXPLANATION AS POLITICAL ECONOMY.** Archaeology is not a closed system and archaeologists cannot be expected to jump over their own shadows. In fact, our science has always been a rather active participant in the political economy of the capitalist system. One cannot even begin to understand certain aspects of the behavior of archaeologists without reference to this system. The interplay between archaeologists and the capitalist system can be illustrated best with the example of two archaeological preoccupations—origins research and regional typology. Neither behavior is very rewarding processually, but both can be seen to gain their preeminence from an external logic—their exquisite fit within the constraints and rewards of the political economy in which the discipline is embedded. (31)

Woodman, Peter Charles (Ulster Museum) **PROBLEMS OF PROCUREMENT AND POPULATION MOBILITY IN THE LATER MESOLITHIC OF N.E. IRELAND.** This paper examines the problems of procurement of raw material for the manufacture of a heavy blade industry and the subsequent distribution of its products. In a region where flint is only available in certain restricted areas, industrial sites placed on the coast have been identified. Sites containing numerous retouched tools and little industrial waste have been found up to 50 km inland along the Bann Valley. This large scale redistribution of the products of industrial sites is considered within the context of

the economic strategies and the level of social organization which may have characterized the later Mesolithic. (13)

Woods, William I. (see Denny, Sidney G.) (39)

Wren, Linnea H. (Gustavus Adolphus) **POWER AND POLITICS: AN ICONOGRAPHICAL STUDY OF THE SCULPTURES AND MURALS OF THE GREAT BALL COURT AT CHICHÉN ITZÁ.** This paper offers an interpretation of the sculptures and murals associated with the Great Ball Court of Chichén Itzá, Yucatán, Mexico. Evidence is drawn from a wide variety of sources to argue that the compositions of the Great Ball Court represent a ceremonial cycle which celebrates the political and military power of Chichén Itzá and that the individual figures represent members of ethnic groups and political factions that struggled to acquire and maintain that power. The implications of this interpretation for the understanding of the "Maya/Toltec" relationship will be seen to accord with recent archaeological evidence. (51)

Wright, Henry T. (Michigan) **PEER POLITY INTERACTION IN EARLY MESOPOTAMIA.** The traditional phrasing of the question of the origin of the state directs attention to political processes operating in one society leading to the emergence of one state. Recent work, however, has emphasized that states rarely, if ever, emerge singly. Instead, a network of interacting polities develop at more or less the same time. This particular kind of peer polity interaction is not merely a categorization of the evidence designed to make our efforts at explanation more difficult; rather, it may be critical to the explanation of the origins of states. In this paper, some of the complexities of this kind of interaction are discussed, then the concepts introduced are illustrated with evidence from later Mesopotamian history. Finally, the meager evidence is considered of what is believed to be the key period, the Early Uruk Period, for the development of states in early Mesopotamia in terms of this conceptualization. (36)

Wynn, Thomas G. (see Staley, Preston S.) (49)

Yellen, John E. (National Science Foundation) **WOMEN IN ARCHAEOLOGICAL RESEARCH: AN NSF PERSPECTIVE.** Analysis of research applications submitted to the Anthropology Program in recent years indicates that female archaeological applicants are significantly less successful than their male counterparts. Examination shows that for some characteristics, such as the basic orientation of the research to be conducted, typical male and female proposals differ. Consideration is given to varying types of proposals and relationships among type of proposal, sex of applicant and the probability of support. Possible causes of observed correlations are considered. (31)

Zeidler, James A. (Illinois) **SAN ISIDRO, A VALDIVIA SITE NEAR BAHÍA, NORTH COASTAL ECUADOR.** Valdivia, the oldest pottery making culture of coastal Ecuador, dates between 3000 and 1700 BC and has hitherto been reported only from the south coast of Guayas Province. Recent and ongoing excavations at San Isidro, a large multicomponent site north of Bahía on the north coast of Manabí, reveal a large Valdivia ceremonial center containing elaborate ceramics, *Spondylus* "plaques," and other items of a complex culture. Comparisons between this rich northern Valdivia and the relatively simple Valdivia sites known from the south affords an instructive example of the differential effects of adaptation to varying ecological and environmental conditions in the tropical, humid north and in the semi-arid zone of the south. (30)

Zubrow, Ezra B. W. (SUNY-Buffalo) **DESIGNING SMALL-SCALE ARCHAEOLOGICAL SURVEYS: THEORETICAL LIMITATIONS AND CASE EXAMPLES.** When designing small-scale archaeological surveys, the limitations of "scale," "goal" and "methodology" are intensified. This paper samples the literature showing that the scale used in small-scale surveys follow a normal distribution. It divides problems of scale into three broad categories of "coverage," "extension" and "comparability," while dividing survey goals into two mutually exclusive groups—"reality reflectors" and "individual goal fulfillers." Finally, methodological limitations created by types of archaeological variables and by observational spacing are discussed. (40)

Zvelebil, Marek (see Green, Stanton W.) (2)