

# Program and Abstracts

SOCIETY FOR  
AMERICAN ARCHAEOLOGY

FORTY-SECOND ANNUAL MEETING

New Orleans, Louisiana

28-30 April 1977

**Forty-Second Annual Meeting**  
**SOCIETY FOR AMERICAN ARCHAEOLOGY**

*Program Chairperson:* Mary Elizabeth King

*Program Committee:* Eileen Johnson, Laura Graves Allen, Carol Slotkin

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**OFFICERS**  
**OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY**

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Margaret L. Weide and William W. Fitzhugh (to 1978)

## GENERAL INFORMATION

**Abstracts** Abstracts of papers presented at this meeting are included in the Program. Additional copies are available for \$1.50 per copy at the membership services desk in the lower mezzanine lounge, or may be ordered prepaid from the Society, 1703 New Hampshire Avenue, NW, Washington, DC 20009.

**Business Meeting** The Society's annual business meeting will begin at 6 pm on Friday in the Royal Salon.

**Convention Office** Any problems or special requests during the meeting should be reported to Convention Office No. 11 located on the upper mezzanine.

**Exhibits** Publishers' book exhibits will be displayed in Meeting Room No. 10 on the second floor from 4 pm to 9 pm Wednesday, 9 am to 5 pm Thursday and Friday, and 9 am to noon on Saturday.

**Membership Services and Publications** A desk will be maintained in the lower mezzanine lounge from 4 pm to 9 pm Wednesday, 8 am to 4 pm Thursday and Friday, and 8 am to noon on Saturday, for those who wish to purchase publications or enroll in the Society.

**Message Center** A self-service message center will be located in the lower mezzanine lounge. This center should NOT be used for messages pertaining to the placement service.

**New Member Reception** Officers of the Society will host a reception for new members and for those attending their first meeting on Friday at 8 pm in Terrace Room No. 2.

**Open House** Everyone is invited to the open reception (cash bar) on Thursday at 5 pm in the upper mezzanine lounge.

**Placement Service** A placement service will be conducted in Meeting Room No. 5 from 9 am to 5 pm on Thursday, Friday, and Saturday. Positions open or wanted may be listed with the service throughout the meeting. Message forms will be provided and box numbers will be assigned for use in the placement service message center.

**Registration** Registration, which includes a copy of the PROGRAM AND ABSTRACTS, is required for attendance at all sessions. Registration desks will be open in the lower mezzanine lounge from 4 pm to 9 pm on Wednesday, 8 am to 4 pm on Thursday and Friday, and 8 am to noon on Saturday. Members who pre-registered by April 10 should claim their programs and badges at the advance registration desk.

**Restaurants** Garden Cafe: serves breakfast, lunch and dinner; Rick's Bar: beverage service only, 11:30 am to 1 am.

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

## MEETING ROOM LOCATIONS

### Lower Mezzanine

Lounge  
Meeting Room No. 1 (Bal Masque)  
Tulane Room

### Upper Mezzanine

Lounge  
Imperial Salon  
Royal Salon  
Presidential Salon  
Convention Office No. 11

### Second Floor

Meeting Room No. 2  
Meeting Room No. 3  
Meeting Room No. 4  
Meeting Room No. 7  
Meeting Room No. 9  
Meeting Room No. 10

### Sixth Floor

Terrace Room No. 1  
Terrace Room No. 2

## PROGRAM

### THURSDAY MORNING, APRIL 28

#### (1) Symposium: MIMBRES PREHISTORY: RESEARCH OF THE MIMBRES FOUNDATION IN SOUTHWESTERN NEW MEXICO

- Meeting Room No. 2  
Organizer and Chairperson: Steven A. LeBlanc  
Participants:  
8:30 Steven A. LeBlanc, Overview and Research Design of the Mimbres Foundation's Work in Southwestern New Mexico  
8:45 Pat Gilman, A Synthesis of the Classic Mimbres Phase with Special Emphasis on the Mattocks Site  
9:00 Catherine LeBlanc, Design Analysis of Mimbres Pottery  
9:15 John Ravesloot, The Post-Mimbres Occupation of the Mimbres Valley: The Classic Period Abandonment and the Casas Grandes Interaction Sphere  
9:30 Ben Nelson, Cliff Phase: The Terminal Pueblo Occupation of the Mimbres Valley  
9:45 Michael Blake, Archaeological Survey of the Deming Plain: Initial Results  
10:00 Dale Rugge, Petrographic Studies of the Mimbres Valley Ceramics with an Emphasis on Intraregional Trade Patterns  
10:15 Bonnie Nelson, A Spatial Analysis of the Classic Sites of the Rio Mimbres of Southwestern New Mexico  
10:30 Paul E. Minnis, Prehistoric Patterns of Wood Utilization and Subsistence Strategies in the Mimbres River Drainage, New Mexico  
10:45 Susan Powell and Paul E. Langenwalter, Changing Subsistence Patterns as Reflected in Faunal Remains from the Mimbres River Area, New Mexico  
11:00 Peggy Rugge, Temporal and Spatial Variation in the Selection and Use of Lithic Materials in the Mimbres Valley  
11:15 Christine Hastorf, Resource Utilization in the Mimbres River Valley: A Catchment Analysis  
11:30 Discussion

#### (2) Symposium: CHRONOLOGICAL FRAMEWORKS OF MESOAMERICA: NEW DATA ON CERAMIC SEQUENCES

- Imperial Salon  
Organizer: Evelyn C. Rattray  
Chairpersons: Jaime Litvak King and Evelyn C. Rattray  
Participants:  
8:00 Anatole Pohorilko, On the Cultural and Historical Validity of Chronological Frameworks that are Solely Based on Ceramic Evidence: A Systematic View  
8:20 Jaime Litvak King, Homotaxiality and Chronology in Mesoamerican Archaeology  
8:40 Paul Schmidt S., The Ceramic Sequence of Xochipala, Guerrero  
9:00 Ann Cyphers Guillen, A Seriation of Chalcatzingo Ceramics  
9:20 Rosa Reyna, Relative Dating of Two Preclassic Sites in the Basin of Mexico  
9:40 Mari Carmen Serra and Yoko Sugiura, A Preliminary Study of the Ceramics of Terremote, Mexico, D.F.  
10:00 Rosa Brambila and Margarita Velasco, Cronología del Oeste del Estado de Querétaro, Mexico—A Traves del Sitio Arqueológico de la Negreta  
10:20 Evelyn C. Rattray, The Teotihuacan Ceramic Chronology: Late Tlamimiloipa to Metepec Phases  
10:40 Robert Cobean, Alba Guadalupe Mastache, Ana María Crespo, and Clara L. Diaz, The Chronology of the Tula Region  
11:00 Diana Molina, A Preliminary Report on the Chronology of Cacaxtla  
11:20 Constanza Vega, Ceramic Stratigraphy in the Sacred Precinct of Tenochtitlan  
11:40 Discussion

#### (3) Symposium: THE POTENTIAL OF DEBITAGE IN CULTURAL INTERPRETATION

- Terrace Room No. 1  
Organizer and Chairperson: Paul R. Fish  
Participants:  
8:30 Paul R. Fish, From Debitage to Behavior: Exploring the Potential  
8:50 Andrea Gerstle, Tool Manufacture at Sabana Grande, Nicaragua  
9:10 Arthur J. Jelinek, Some Uses of Debitage in Archaeological Analysis  
9:30 Charles M. Baker, Prehistoric Lithic Resource Procurement/Utilization Strategies: A General Approach to Stone Age Economics  
9:50 Luis Hurtado de Mendoza, Obsidian Exploitation and Social Structure in Precolumbian Guatemala  
10:00 Don Keller, The Tolchaco Complex in the Light of Debitage Analysis  
10:30 Conran C. Hay, Variability in Wear Patterns on Obsidian Flakes  
10:50 Richard W. Jefferies, Intersite Activity Variability as Revealed through Technological Analysis of Lithic Debitage

- 11:10 Leslie Lavine-Lischka, Debitage as the Key Factor to Behavioral Patterns on a Lithic Site
- 11:30 Landon D. Smith and Albert Goodyear, Experimental Discrimination of Percussor Type by Debitage Analysis
- (4) Symposium: VOLCANISM AND HUMAN HABITATION IN THE NEW WORLD  
Meeting Room No. 1 (Bal Masque)  
Organizer and Chairpersons: Donald K. Grayson and Payson D. Sheets  
Participants:  
8:30 Virginia Steen-McIntyre, Tephrochronology (Volcanic Ash Chronology) and Its Application to Archaeology  
8:50 William B. Workman, The Significance of Volcanism in the Prehistory of Subarctic Northwest North America  
9:10 Donald K. Grayson, Mt. Mazama, Middle Holocene Climatic Change, and Nonequilibrium Insular Biogeography in the Northern Great Basin  
9:30 Peter J. Pilles, Jr., Sunset Crater and the Sinagua: A New Interpretation  
9:50 Richard H. Hevly, Biotic Effects of Volcanism and Paleoclimatic Change in the Vicinity of Flagstaff, Arizona A.D. 1050-1300  
10:10 Mary Lee Nolan, Human Consequences of the Paricutin Eruption, Michoacan, Mexico  
10:30 P. W. Lambert and S. Valastro, Jr., Late Quaternary (Post-15,000 B.P.) Volcanic Activity of Popocatepetl Volcano, Mexico  
10:50 Payson D. Sheets, Environmental and Cultural Impact of the Volcan Ilopango Eruption, El Salvador  
11:10 Erasmus W. Smith and A. Colin Renfrew, Minoan Crete as Lost Atlantis? The Thera Eruption of ca. 1500 B.C.  
11:30 Discussants: Harold Malde, Peter J. Mehringer, Jr.
- (5) General Session: STUDIES IN PALEOECOLOGY  
Presidential Salon  
Chairperson: Charles Miksicek  
Participants:  
9:00 James Grady, Animal Behavior Patterns as an Economic Determinant of Archaeological Site Location  
9:15 Frank E. Bayham, Pleistocene Megafauna: Trophic Organization and Population Regulation  
9:30 Burton L. Purrington and Mary Lee Douthit, Changing Patterns of Habitat Utilization in a Southern Appalachian Locality  
9:55 Stanton W. Green and Thomas Ulrich, The Statistical Analysis of Environmental Variation: A Mapping Approach  
10:10 Diane McLaughlin and Charles Miksicek, The Potential of Artifactual Pollen Washes for Recovering Environmental and Statistical Data  
10:25 Karl W. Butzer, Changing Holocene Environments at the Koster Site: The Geomorphological Perspective  
10:50 David R. Yesner, Methods for Analyzing Prehistoric Biotic Potential and Resource Exploitation
- (6) General Session: ARCHAEOLOGY OF EASTERN NORTH AMERICA  
Royal Salon  
Chairperson: Thomas J. Riley  
Participants:  
9:00 Thomas J. Riley and Glenn Freimuth, Field Systems and Frost Drainage in Native North America  
9:15 Stephen A. Chomko and Gary W. Crawford, New Evidence for Cultigens in Late Archaic Archaeological Sites  
9:30 Wesley R. Stinson and Harvey Luce, Soil Science and Archaeology  
9:55 Kevin McBride, Preliminary Report on the Floral Remains of Woodchuck Knoll  
10:10 James M. Adovasio, Joel D. Gunn, J. Donahue, and R. Stuckenrath, Meadowcroft Rockshelter: Retrospect 1976  
10:25 Michael L. Hoffman, Man in Blue Ridge—A Multi-Disciplinary Approach to the Study of Cultural Resources of the Shenandoah National Park  
10:40 John W. Fuller, The Development of Late Prehistoric Town Communities in Northern West Virginia—The Test of a Model  
11:05 David J. Ives and David R. Evans, The Meramec Archaeological Project 1976-77
- (7) Symposium: STONE AGE ARCHAEOLOGY IN MEDITERRANEAN EUROPE.  
PART I: PALEOLITHIC AND MESOLITHIC  
Terrace Room No. 2  
Organizers: Joseph L. Chartkoff and Eugene Sterud  
Chairperson: Joseph L. Chartkoff  
Participants:  
8:30 Katherine Flattiger, New Aspects of the Mousterian from Southern and Eastern Spain  
8:50 Lawrence E. Bradley, Artifact Variability in the Early Upper Paleolithic of Southern Central Europe  
9:10 Joseph L. Chartkoff, Time and Settlement at Petriolo during the Wurm  
9:30 Francis B. Harrold, Jr., A Reappraisal of the Chatelperronian  
9:50 Anta Montet-White, Selection Processes in Tool Manufacture

- 10:10 Elizabeth Prinz, Mesolithic-Neolithic Transition in the Iron Gates Gorge  
10:30 Ivana Radovanovic, Edgewear and Tool Types at Petriolo II  
10:50 John Van Alsburg, Fourier Shape Analysis of Mousterian and Upper Paleolithic Tools from Petriolo II, Italy  
11:10 Randolph E. Donahue, Optical Scanning for Artifact Attribute Recording at Petriolo II  
11:30 Discussants: Geoffrey Clark, Leslie G. Freeman
- Part II: See Thursday afternoon, Session 16
- (8) EARLY SEDENTARY SETTLEMENTS IN THE MOIST TROPICS OF NORTHERN SOUTH AMERICA. PART I: FIRST INHABITANTS OF THE TROPICAL ALLUVIUM OF NORTHERN SOUTH AMERICA  
Tulane Room  
Organizers and Chairpersons: Donald Lathrap and Jorge G. Marcos  
Participants:  
8:00 Doris Z. Stone, Introductory Remarks  
8:30 Presley Norton, Loma Alta  
9:00 Gerardo Reichel-Dolmatoff, The Magdalena  
9:40 Erika Wagner, The Maracaibo Basin  
10:20 Anna Roosevelt, La Gruta, An Early Ceramic Phase of the Middle Orinoco Basin  
10:40 Peter Paul Hilbert, The Early Formative in the Trombetas Region of the Amazon  
11:10 P. Pedro Porras, Fase Pastaza  
11:30 Discussants: Norman Hammond, D. Collier, J. Cruxent
- Part II: See Thursday afternoon, Session 9
- THURSDAY AFTERNOON, APRIL 28
- 12:00- DISCUSSION OF REGIONAL OVERVIEW CONCEPT  
1:30 Presidential Salon  
Open Meeting sponsored by American Society for Conservation Archaeology
- (9) Symposium: EARLY SEDENTARY SETTLEMENTS IN THE MOIST TROPICS OF NORTHERN SOUTH AMERICA. PART II: THE NATURE OF VALDIVIA AND THE FORMATIVE OF SOUTH AMERICA  
Tulane Room  
Organizers and Chairpersons: Donald Lathrap and Jorge G. Marcos  
Participants:  
2:00 C. Zevallos, Nuevas Excavaciones en Cerro Sentinela  
2:30 I. Jarrin, Engomala un Sitio Valdivia Tardío  
3:00 Emily Lundberg, Reappraisal of Valdivia Figurines Based on Controlled Feature Contexts  
3:30 James Zeidler, Early Formative Settlement in the Chanduy Valley, Southwest Ecuador  
4:00 Jorge G. Marcos, Real Alto—Is Valdivia Really the Early Formative of Ecuador?  
4:30 Mario Sanjoa O., La Tradicion Barrancoide y el Formativo Suramericano  
4:50 Discussants: Michael E. Moseley, William T. Sanders
- Part III: See Thursday evening, Session 21
- (10) Symposium: THE SOUTHWESTERN ANTHROPOLOGICAL RESEARCH GROUP: RESULTS TO DATE  
Royal Salon  
Organizers: Sylvia Gaines and Fred Plog  
Chairperson: Robert C. Euler  
Participants:  
2:00 Dee F. Green, The Evolution of the SARG Research Design  
2:20 Sylvia Gaines, The Evolution of the SARG Computer Format and Data Bank  
2:40 Richard Efland, The Use of the SARG Data Bank in Hypothesis Testing  
3:00 W. James Judge, A Project-Specific Evaluation of the SARG Results  
3:20 Jeffrey S. Dean, An Evaluation of the SARG Effort  
3:40 Fred Plog, A Revised SARG Research Design  
4:00 Discussion
- (11) Symposium: MAYA INTELLECTUAL ACTIVITIES IN THE CLASSIC AND POST-CLASSIC  
Imperial Salon  
Organizer and Chairperson: Marshall Durbin  
Participants:  
2:00 Munro S. Edmonson, Maya Historiography  
2:30 James A. Fox and John Justeson, Aspects of Maya Astronomic Inscriptions  
3:00 Florence Liman, Identification of Emblem Glyphs and the Provenience of an Unusual Stela  
3:30 John S. Justeson and James A. Fox, Classic Maya Dynastic Relations  
4:00 Andrew Hofling, Architectural Features and their Domains in the Late Classic

4:30 Marshall Durbin, Literary Traditions among the Maya

- (12) Symposium: THE ARCHAEOLOGY OF THE VIRGIN ISLANDS NATIONAL PARK  
Meeting Room No. 2  
Organizer and Chairperson: James W. Stoutamire  
2:00 James W. Stoutamire, Introduction to the History of Research in the Virgin Islands National Park  
2:15 James W. Thomson, Recent National Park Service Archaeological Research in the Virgin Islands National Park  
2:35 Jay B. Haviser, Ceramic and Lithic Typology for the Virgin Islands National Park  
2:55 Forrest D. Cring, Analysis of Faunal Materials from Cinnamon Bay  
3:15 Katherine Dinnel, Historic Ceramics and Human Remains from the Virgin Islands National Park  
3:45 James W. Stoutamire, Summary of Virgin Island Archaeology and Recommendations for Future Research  
4:05 Discussion

(13) Symposium: BONE TECHNOLOGY: EXPERIMENTATION, ASSEMBLAGES, AND NON-HUMAN MODIFICATION

Terrace Room No. 1  
Organizer: Eileen Johnson  
Chairperson: Robson Bonnichsen

Participants:

- 2:00 Robson Bonnichsen, Bone Pretreatment  
2:20 George Frison, Bone Butchering Tools in Prehistoric Bison Kill Sites  
2:40 Susanne J. Miller, Taphonomy of Extinct Megafauna Accompanying a Fluted Point Tradition at Owl Cave, the Wasden Site, Idaho  
3:00 Break  
3:20 Eileen Johnson, Paleo-Indian Bone Expediency Tools—Lubbock Lake and Bonfire Shelter  
3:40 T. Weber Greiser, The Jones-Miller Hell Gap Site Bone Tool Assemblage  
4:00 Joe Ben Wheat, Bone Technology at Jurgens, Olsen-Chubbs, and Little Box Elder Cave  
4:20 Carolyn Ekland and Phillip Grant, Discriminant Analysis of Fragments from Long Bone Diaphyses

(14) General Session: STUDIES IN LITHIC TECHNOLOGY

Meeting Room No. 1 (Bal Masque)  
Chairperson: Patrick C. McCoy

Participants:

- 2:00 Susan M. Chandler and John A. Ware, The Discrimination of Technological Behavior: An Experiment in Lithic Replication  
2:25 Patrick C. McCoy, Archaeological Investigations at the Mauna Kea Adz Quarry Complex, Hawaii: Preliminary Results of the 1975-76 Fieldwork  
2:50 Harvard G. Ayers, Chemical Characterization of North American Chert Sources  
3:15 Charles A. Reher and George Frison, Territorial Inference from Source Analysis of Lithic Assemblages  
3:40 Ronald Spielbauer, A Suggested Elemental Solution to the Identification Problem of Concentrically Banded, Blue-gray Cherts from Southern Indiana and Illinois  
3:55 James B. Stoltman, Observations and Experiments on Thermal Pretreatment of Chert from an Early Archaic Quarry-Workshop in Southwestern Wisconsin  
4:10 Kelley C. Duncan, Analysis of a Burnt Rock Midden Site in Southeastern Oklahoma  
4:25 Allen P. McCartney, A Thule Cobble Industry from Somerset Island, N.W.T.

(15) Symposium: COMPUTER SIMULATION AS ARCHAEOLOGICAL MODEL BUILDING

Presidential Salon  
Organizers and Chairpersons: Mark S. Aldenderfer and James W. Hatch

Participants:

- 2:00 Bennett Dyke, On the Appropriate Use of Computer Simulation  
2:20 Ezra B. W. Zubrow, Simulation and the Application of a Kriging Sampling Design to a Regional Survey  
2:40 Albert Ammerman and Diane Gifford, A Simulation Study of Excavation Strategies at a Maasi Settlement  
3:00 James W. Hatch, Measuring the Effects of Sampling Error in Ceramic Frequency Seriation  
3:20 Mark S. Aldenderfer, The Computer Simulation of Assemblage Formation Models in Hunter-gatherer Archaeology  
3:40 Alan N. Snavely and Cindy J. Parsons, Simulation and Black Box Processes: Forest Growth and Intrasite Artifact Distribution  
4:00 Discussant: David Hurst Thomas

(16) Symposium: STONE AGE ARCHAEOLOGY IN MEDITERRANEAN EUROPE. PART II: NEOLITHIC AND CHALCOLITHIC

Terrace Room No. 2  
Organizers: Joseph L. Chartkoff and Eugene L. Sterud  
Chairperson: Eugene L. Sterud

Participants:

- 2:00 Ruth Tringham, Resource Utilization in Neolithic Yugoslavia  
2:20 Cheryl Claassen, Estimating Occupation Span from Artifacts: A Trial Run at Staro Selo, Yugoslavia  
2:40 Judith Rasson, Coast-interior Relationships in the Adriatic Neolithic  
3:00 Brad Bartel, Bow-wave Diffusion and Neolithic Figurine Distribution in the Mediterranean  
3:20 Alan McPherron, Changes in Settlement and Subsistence between Early and Later Neolithic in Yugoslavia  
3:40 Eugene L. Sterud, The Dynamics of Early Food Production in the Dinaric Region of Mediterranean Europe  
4:00 Daniel Evert, A Test of Generalizations Concerning Post-Pleistocene Man-Land Relationships: The Italian Case  
4:20 Thomas W. Jacobsen, Observations about the Origins of Plant and Animal Husbandry in Southern Greece  
4:40 Discussants: Robert K. Evans, Harold Koster, A. C. Renfrew

THURSDAY EVENING, APRIL 28

5:00- OPEN HOUSE  
6:30 Upper Mezzanine Lounge

5:00- AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY  
7:00 Meeting Room No. 2  
Business Meeting

7:00- ASSOCIATION FOR FIELD ARCHAEOLOGY  
8:00 Royal Salon  
Business Meeting

(17) General Session: MIDWESTERN ARCHAEOLOGY

Terrace Room No. 1  
Chairperson: Joseph Tainter

Participants:

- 8:00 Naidyne Brown Bridwell, The Manifold Benefits of High School Field Archaeology  
8:15 Nan A. Rothschild, Skeletons in the Closet: The Analysis of Prehistoric Social Organization through Mortuary Sites  
8:30 Joseph Tainter, Woodland Social and Economic Systems in West-central Illinois  
8:55 A. M. Cantwell, Functional Analysis of Two Early Havana Tradition Sites  
9:10 N'omi Greber, The Use of Nonparametric Statistical Ranking Procedures in the Analysis of Hopewell Burial Patterns Found in Seip Mound 1, Ross County, Ohio  
9:35 Diana diZerega Rockman, The Hopewellian Way of Death  
9:50 Elizabeth Benchley, Presalvage Investigations at Cahokia  
10:05 Joan Gardner and Mary Elizabeth King, Textiles from Spiro, Oklahoma

(18) Symposium: CULTURAL RESOURCE MANAGEMENT—THE FEDERAL PROGRAMS AND ARCHAEOLOGISTS' EXPERIENCE

Imperial Salon  
Organizer and Chairperson: David Sanger

Participants:

- 8:00 Mark R. Barnes, The Role of the Office of Archeology and Historic Preservation  
8:15 Charles J. Spilker, The Role of the Advisory Council on Historic Preservation  
8:30 Richard Anuskiewicz, The Role of the Professional Archaeologist with the U.S. Army Corps of Engineers  
8:45 David Sanger, Universities and the State Historic Preservation Officer  
9:00 Charles Bolian, The Role of the University Archaeologist  
9:15 Alton Briggs, The Role of the Archaeologist on the State Historic Preservation Officer's Staff  
9:30 Roger W. Moeller, The Role of the Private Archaeological Research Organization

(19) General Session: PLAINS ARCHAEOLOGY

Meeting Room No. 1 (Bal Masque)  
Chairperson: T. R. Hays

Participants:

- 8:00 Mark Lynott, Toward a Regional Research Design for North-Central Texas  
8:25 E. Mott Davis, Patience E. Patterson, S. Valastro, Jr., and Alejandra V. Varela, A Review of Radiocarbon Dating in the Caddoan Archaeological Area  
8:50 T. R. Hays, Larry W. Morgan, and James W. Thomson, A Reexamination of the Archaic-Neo-American Transition in North-Central Texas  
9:05 Elizabeth Ann Morris and James R. Marcotte, Preliminary Report on the Archaeology of the Lightning Hill Site (5LR284) in the Foothills of Northern Colorado  
9:20 Frank W. Eddy and Ric Windmiller, An Application of the Wyoming Projectile Point Chronology to Dating of an Eastern Colorado Foothills Site Survey

- 9:35 Fred E. Schneider, Hendrickson: A Coalescent Fortified Site in Eastern North Dakota
- (20) General Session: OLD WORLD ARCHAEOLOGY  
Terrace Room No. 2  
Chairperson: Norman Yoffee  
Participants:  
8:00 Norman Yoffee, The Decline and Rise of Mesopotamian Civilization: an Ethnoarchaeological Perspective on the Evolution of Social Complexity  
8:25 Rhonda L. Andrews, Ronald C. Carlisle, and J. M. Adovasio, The Textile and Basketry Impressions of Jarmo  
8:50 Anne Attebury, New Excavations at Kharga Oasis: The Aterian Workshop (Site E76-4)  
9:15 James I. Ebert, Mobility, Climate, and Specialization in the Middle and Late Stone Ages of Southern Africa  
9:30 Milla Y. Ohel, The Clactonian-Acheulian Interface in Britain: Research Summary and Conclusions
- (21) Symposium: EARLY SEDENTARY SETTLEMENTS IN THE MOIST TROPICS OF NORTHERN SOUTH AMERICA. PART III: EVIDENCE OF POPULATION MOVEMENTS OUT OF THE MOIST TROPICS OF SOUTH AMERICA  
Tulane Room  
Organizers and Chairpersons: Donald W. Lathrap and Jorge G. Marcos  
Participants:  
8:00 Louisa Stark, Linguistic Evidence for Early Migrations in South America  
8:30 Louis Allaire, From Prehistory to History in the Lesser Antilles: The Problem of Carib Migrations  
9:00 Donald W. Lathrap, Iconographic Unity between Mesoamerica and South America  
9:30 Gareth Lowe, Norman Hammond, and Duncan Pring, Earliest Formative of Mesoamerica and Possible Antecedents  
10:00 Discussant: Irving Rouse

Part IV: see Friday morning, Session 22

#### FRIDAY MORNING, APRIL 29

- 9:00-12:00 SOUTHEAST ARCHAEOLOGICAL CONFERENCE ("The late Pleistocene in the Southeastern United States," a continuation of a dialogue begun at the Southeastern Archaeological Conference)  
Meeting Room No. 9  
Open Meeting  
Chairpersons: Dan F. Morse and Cailup Curren, Jr.
- (22) Symposium: EARLY SEDENTARY SETTLEMENTS IN THE MOIST TROPICS OF NORTHERN SOUTH AMERICA. PART IV: INTENSIFICATION OF AGRICULTURAL SYSTEMS IN THE NEW WORLD. WAS IT A UNITARY PHENOMENON?  
Tulane Room  
Organizers and Chairpersons: Donald W. Lathrap and Jorge G. Marcos  
Participants:  
8:30 Walton C. Galinat, Valdivia Maize and Its Significance  
9:00 Deborah Pearsall, The Botanical Analysis of Real Alto: An Initial Model of Valdivia Subsistence  
9:30 Alberta Zucchi, Ecological Variability and Prehispanic Agriculture in the Venezuelan Llanos  
10:00 James J. Parsons, Ridged Fields in Colombia and Ecuador  
10:30 Dennis Puleston, Raised Fields in Mesoamerica and South America: Colonization or Independent Invention  
11:00 Robert Bird, The Evolution and Influences of the Maize of the Intermediate Area  
11:20 Discussants: E. Earle Smith, G. S. Stephens, Bennett Bronson
- (23) Symposium: REMOTE SENSING IN MESOAMERICA, PART I  
Terrace Room No. 1  
Organizers: James J. Hester and James Grady  
Chairperson: James J. Hester  
Participants:  
8:30 Ray T. Matheny, Detection and Mapping of Ancient Water Controls in the Maya Lowlands by Aerial Photography  
8:50 Barbara Stark and Dennis Young, Linear Nearest Neighbor Analysis of Cabeza de la Vaca Sites, Veracruz, Mexico  
9:10 Elinor Large, Comparison of Modern and Prehistoric Settlement Patterns in the Lower Papaloapan Basin, Veracruz, Mexico  
9:30 Bruce Dahlin, Richard E. W. Adams, T. Patrick Culbert, and Barbara Stark, The Proposed Comprehensive Maya Lowland Mapping Project  
9:50 Robert Hardwick, Technical and Fiscal Considerations of Imagery Acquisition in Central America

- 10:10 James J. Hester, James Grady, and Claudia Nissley, Aerial Photo Interpretation of the Copan Ceremonial Center  
10:30 Don S. Rice, A Comparison of Approaches for Investigating the Heterogeneity and Potential Productivity of the Lowland Maya Environment  
11:00 Discussants: Elmer Harp, Tom Lyons, Richard Blanton, Evon Vogt
- Part II: See Friday afternoon, Session 31
- (24) Symposium: THE DEVELOPMENT OF ETHNOARCHAEOLOGY, PART I  
Presidential Salon  
Organizer and Chairperson: Michael B. Stanislawski  
Participants:  
9:00 William A. Longacre, Kalinga Pottery Making  
9:15 P. Bion Griffin and Wilhelm G. Solheim II, Ethnoarchaeological Research in Asia  
9:30 Mary Elizabeth Shuter, Richard Shuter, Jr., Jan Frost, and Everett Frost, Potsherds and People  
10:00 J. R. Specht, A Review of Ethnoarchaeology Studies in New Guinea  
10:15 Brian Hayden and James O'Connell, Ethnoarchaeology in Australia: A Review  
10:30 Patty Jo Watson and S. E. Van Der Leeuw, Ethnoarchaeology in the Near East  
10:45 Frederick R. Matson, Ethnoarchaeology of Nomadic and Village Potterymaking Groups in the Near East  
11:00 Diane Gifford and Dinah Crader, African Hunters and Gatherers: Ethnoarchaeology  
11:15 J. Desmond Clark and Glynn Isaac, Aspects and Prospects of Ethnoarchaeological Research in Africa  
11:30 Discussants: Glynn Isaac, J. Desmond Clark
- Part II: See Friday afternoon, Session 32
- (25) Symposium: MISSISSIPPIAN SETTLEMENT PATTERNS  
Terrace Room No. 2  
Organizer and Chairperson: Bruce D. Smith  
Participants:  
8:00 Alan D. Harn, Mississippian Settlement Patterns in the Central Illinois River Valley  
8:20 Thomas J. Green and Cheryl L. Munson, Mississippian Settlement Patterns in Southwestern Indiana  
8:40 Patricia S. Essenpreis, Fort Ancient Settlement: A Case Study of Response at a Mississippian-Late Woodland Interface  
9:00 Melvin Fowler, Cahokia and the American Bottoms: Settlement Archaeology  
9:20 Jon Muller, The Kincaid System: Mississippian Settlement in the Environs of a Large Site  
9:40 James E. Price, The Powers Phase Settlement System  
10:00 James A. Brown, Robert E. Bell, and Don G. Wyckoff, Caddoan Settlement Patterns in the Arkansas River Drainage  
10:20 Roy S. Dickens, Jr., Mississippian Settlement Patterns in the Appalachian Summit Area  
10:40 Charles E. Pearson, Analysis of Late Mississippian Settlement on Ossabaw Island, Georgia  
11:00 Christopher S. Peebles, Determinants of Settlement Size and Location of the Moundville Phase, Alabama  
11:10 Vincas P. Steponaitis, Central Place Models in Pre-Market Contexts: A Mississippian Example  
11:20 David S. Brose and George R. Percy, Fort Walton Settlement Patterns  
11:40 Bruce D. Smith, Variation in the Complexity of Mississippian Settlement Patterns  
11:50 Discussants: James B. Griffin, Stephen Williams
- (26) Symposium: AMERICAN SOCIETY FOR CONSERVATION ARCHEOLOGY SYMPOSIUM: CULTURAL RESOURCE MANAGEMENT AND ARCHAEOLOGICAL RESEARCH—IN PRACTICE  
Royal Salon  
Organizer and Chairperson: Don D. Fowler  
Participants:  
8:00 Martin E. McAllister, PCRMCPA: Public Cultural Resource Management (Conservation, Preservation, and Salvage) Archaeology  
8:20 James T. Rock, Bureaucracy and Cultural Resource Management  
8:40 Joel I. Klein, The SHPO, Federal Agencies, and the Contract Archaeologist: A Cautious Menage  
9:00 Alexander J. Lindsey, Jr. and Mark E. Randall, Cultural Resource Management as a Business, and Its Place in the Business World  
9:20 Daniel E. Fox and Jerry Alexander, Business-Like Archaeology: The Potential for Application of Management Controls  
9:40 E. Charles Adams, The Changing Nature of Archaeological Data, or How to Get Along on a Scarce Resource  
10:00 Alston Thoms and W. J. Mayer-Oakes, Research Design—Theoretical Uniformity, Clarification or Stagnation?  
10:20 Mark A. Grady, Research Designs and Cultural Resource Management: Some Practical Considerations

- 10:40 S. Alan Skinner, Quality Control in American Archaeology  
 11:00 Daniel J. Lenihan, The National Reservoir Inundation Study  
 11:20 Discussants: Herrick E. Hanks, Margaret Weide, Bennie Keel
- (27) Symposium: HOLOCENE ENVIRONMENTS AND HUMAN POPULATIONS ON THE PECOS RIVER, NEW MEXICO**  
 Meeting Room No. 1 (Bal Masque)  
 Organizers and Chairpersons: Joseph G. Gallagher and Charles M. Mobley  
 Participants:  
 8:00 Larry V. Nordby, Upper Pecos River Valley Archaeology: A Review and a Beginning  
 8:20 Charles M. Mobley, Aboriginal Adaptations Along the Pecos River Near Santa Rosa, New Mexico  
 8:40 Chester Shaw, Lithic Exploitation and Technology in the Upper Pecos River Valley  
 9:00 James H. Gunnerson, Historic Indian Occupations in the Upper Pecos Area  
 9:20 Frances Levine, Nomadic Pastoralism on the Pecos River during the Mexican and Territorial Periods  
 9:40 Tony L. Burgess, A Reconstruction of the Vegetation of the Brantley Reservoir Area Prior to Anglo-American Settlement  
 10:00 Thomas R. Van Devender and Diane E. McLaughlin, Late Holocene Vegetational Transition in Rocky Arroyo and Last Chance Canyon, Eddy County, New Mexico  
 10:20 Susan Applegarth, Paleoecology and Prehistoric Exploitation of the Eastern Slopes of the Guadalupe Mountains, Southeastern New Mexico  
 10:40 Joseph G. Gallagher, An Analysis of Prehistoric Settlement Functions Within the Brantley Reservoir, New Mexico  
 11:00 Discussants: Jane Kelley, Reggie Wiseman
- (28) Symposium: PRESENT ARCHAEOLOGICAL RESEARCH IN LOWER CENTRAL AMERICA**  
 Imperial Salon  
 Organizers and Chairpersons: Richard W. Magnus and Frederick W. Lange, Michael J. Snarskis  
 Participants:  
 8:00 Richard M. Accola, A Preliminary Application of X-ray Diffraction Analysis to the Study of Nicoya Polychrome Ceramics  
 8:20 Karen Olsen Bruhns, Archaeological Investigations at Cihuatan, El Salvador  
 8:40 Richard G. Cooke, The Exploitation of Animal Resources Along the Pacific Littoral of Central Panama  
 9:00 W. J. Kennedy, Archaeological Investigation at Torito, An Early Period Site in the Reventazon River Valley, Costa Rica  
 9:20 Frederick W. Lange, Excavations at the Vidor Site, Guanacaste, Costa Rica  
 9:40 Richard W. Magnus, The Siteia Complex: Its Implications for the Late Formative of Lower Central America  
 10:00 Jean-Francois Moreau, A Biological Approach to Site Seasonality: Shell Analysis of Two Costa Rican Inland Shell Middens  
 10:20 Roberto Reyes, Petroglifos y Pictoglyphos de Honduras: Estilos y Secuencia Tentativa  
 10:40 Doris Stone, The Possible Roots of Rosales Zones Engraved Ware from the Greater Nicoya Region: An Hypothesis  
 11:00 Michael Snarskis, Finca Guardiria: First Analysis of a Fluted Point Industry from Costa Rica  
 11:20 Laura Laurencich Minelli, Sugestion de Mayor Antiguedad del Bicromo en Zona en Nicoya  
 11:40 Discussants: Richard W. Magnus, Frederick W. Lange, Michael J. Snarskis
- (29) General Session: ARCHAEOLOGICAL METHOD AND THEORY, PART I**  
 Meeting Room No. 2  
 Chairperson: Joel Gunn  
 Participants:  
 9:00 Philip A. Bandy, Report and Test of a New Technique for Mapping and Recovery of "Exposed" Archaeological Sites  
 9:15 Joel D. Gunn and Royce Mahula, Linear Distribution Analysis  
 9:30 John W. Weymouth, A Magnetometer Survey of Sakakawea Village Earth Lodges  
 9:45 Lynne Goldstein, Cultural Periods vs. Cultural Systems: Does Shell-Tempered Pottery a Mississippian Make?  
 10:00 Donald A. Graybill and Charles E. Pearson, The Utility of the Rank-Size Rule in Archaeological Research  
 10:15 Steven Hackenberger, Experimental Designs in Archaeological Research: Pre-packaged Procedural Sets in Logic and Statistical Analysis  
 10:30 Sarah M. Nelson, Models of Shifting Settlements in Butler Wash, Utah  
 10:45 Donald M. Perrill, The Location of Archaeological Sites in the Ice-Free Corridor of North America: A Consideration for Adaptation in Paleo-foehn Habitats  
 11:00 Larry D. Hailey, Landmark Features as an Aid to Site Location Analysis  
 11:15 Robert M. Luton and David P. Braun, A Method for Testing the Significance of Aggregation and Association in Archaeological Grid Cell Count Arrangements

## FRIDAY AFTERNOON, APRIL 29

- 12:00 1:30 SOCIETY FOR AMERICAN ARCHAEOLOGY COMMITTEE ON THE STATUS OF WOMEN IN ARCHAEOLOGY**  
 Meeting Room No. 1  
 Open Meeting
- 12:00-2:00 AD HOC GROUP ON ARCHEOLOGICAL SURVEY AND PRESERVATION IN MICRONESIA**  
 Meeting Room No. 7  
 Organizational Meeting
- 5:45 SOCIETY FOR AMERICAN ARCHAEOLOGY ANNUAL BUSINESS MEETING**  
 Royal Salon  
 Raymond Thompson, President
- (30) General Session: ARCHAEOLOGY OF SOUTH AMERICA**  
 Imperial Salon  
 Chairperson: James B. Richardson III  
 Participants:  
 2:00 Elizabeth S. Wing, Dispersal of Native Domestic Animals in Northwestern South America  
 2:25 W. J. Mayer-Oakes, Problems of Early Man Chronology in the Northern Andes  
 2:40 Kathleen Mary Byrd, Animal Utilization and Exploitation Patterns in Prehistoric Southwest Ecuador  
 2:55 Bruce Dickson and Gordon F. McEwan, Valdivia, Jomon Fishermen, and the Nature of the North Pacific: Some Nautical Problems with Meggers, Evans, and Estrada's (1965) Trans-Oceanic Contact Thesis  
 3:20 Patricia J. Netherly, On Defining the North Coast of Peru  
 3:45 Margaret A. Hoyt, Diagnostic Features of Chimú Inca Ceramics  
 4:00 James B. Richardson III and Elena Decima Zamecnik, The Talara Tar Pits: 11,000 Years of Human Utilization  
 4:25 John W. Greer, La Paloma, A Middle Preceramic Village on the Central Peruvian Coast: Introduction to the 1976 Excavations  
 4:40 Jeffrey Quilter, An Analysis of Preceramic Burials from the La Paloma Site, Chilca Valley, Peru  
 4:55 Mark Druss, Computer Analysis of Chiuchiu Complex Settlement Patterns  
 5:10 Robert W. Neuman, An Archaeological Survey of the Dry Pampa Area, Western Argentina
- (31) Symposium: REMOTE SENSING IN MESOAMERICA, PART II**  
 Terrace Room No. 1  
 Organizers: James J. Hester and James Grady  
 Chairperson: James Grady  
 Participants:  
 2:00 B. Lea Baker, A Test of the Utility of Aerial Photography in Studying Prehistoric Maya Rural Settlement Patterns in Yucatan, Mexico  
 2:20 Richard K. Allen, Edward B. Kurjack, David T. Vleck, and Robert T. Wilson, An Easier Way to Map Maya Ruins  
 2:40 Antonio Benavides and Ferdinand Robles, Air Photo Interpretation at Cobá  
 3:00 Sylvia Garza and Edward B. Kurjack, Remote Sensing in the Yucatan Peninsula  
 3:20 Julian Whittlesey, Low-level Aerial Photo Platforms for Recording and Remote Sensing in Archaeology  
 3:40 La Verne Herrington, Prehistoric Field and Irrigation Systems of the Rio de Arenas and Cameron Creek Drainages, Grant County, New Mexico  
 4:00 Discussants: George Guzman, Norman Hammond, Richard E. W. Adams, Christopher Allen
- (32) Symposium: THE DEVELOPMENT OF ETHNOARCHAEOLOGY: A WORLD-WIDE PERSPECTIVE, PART II**  
 Presidential Salon  
 Organizer and Chairperson: Michael B. Stanislawski  
 Participants:  
 2:00 Warren R. DeBoer and Dean Arnold, The Womb and the Tomb: Contrasting Models for Understanding Amazon Prehistory  
 2:15 S. E. Van Der Leeuw and Dean Arnold, Ethnoarchaeology of Andean South America: European and American Views  
 2:30 Dean Arnold, Margaret Hardin, and Phil C. Weigand, A Review of Ethnoarchaeological Studies in Mesoamerica  
 3:00 Thomas F. Kehoe, Alice B. Kehoe, and Robert Hall, The "Direct Ethnological" Approach, Ethnoarchaeology, and Ethnohistory in Eastern Anglo-America  
 3:30 Ted Frisbie and Florence Hawley Ellis, A Review of Ethnoarchaeology in Western United States and North Mexico  
 4:00 Robert E. Ackerman, The Arctic and Sub-Arctic  
 4:15 Joan B. Townsend, Ethnoarchaeology: Perspectives from the North American Sub-Arctic  
 4:30 Discussants: Frank Hole, Michael B. Stanislawski  
 5:00 Discussion: Entire Panel

(33) Symposium: RECENT RESEARCH IN LEVANTINE PREHISTORY

- Meeting Room No. 2  
Organizers and Chairpersons: Frederick C. Munday and Alan H. Simmons  
Participants:  
2:00 Frederick C. Munday, Intersite Technological Variability in the Mousterian of the Avdat/Aqev Area, Central Negev, Israel  
2:20 Harold J. Hietala and Dominique E. Stevens, Sedentism in the Mousterian: A Case Study  
2:40 Anthony E. Marks, A Middle to Upper Paleolithic Transition in the Southern Levant  
3:00 Gerald Kukan, Technological Change in the Levantine Epipaleolithic  
3:20 Thomas R. Scott, The Harifian Occupation of the Negev and Sinai  
3:40 Paul Larson, Natufian Adaptive Strategies in the Central Negev, Israel in the Anti-Lebanon Mountains  
4:00 H. Bruce Schroeder, Nacharini, A Stratified Post-Natufian Camp  
4:20 Alan H. Simmons, Pre-Pottery Neolithic B Occupations of the Western Negev, Israel: Economic Potentials  
4:40 Donald O. Henry, A Report on the Excavations at Hayonim Terrace, Western Galilee, Northern Israel: 1974 and 1975 Seasons  
5:00 Discussion

(34) General Session: MESOAMERICAN ARCHAEOLOGY AND ETHNOHISTORY

- Tulane Room  
Chairperson: Warren Barbour  
Participants:  
2:00 Margaret J. Schoeninger, Diet and Social Status During the Formative Period in Mesoamerica  
2:15 Warren Barbour, Prehistoric Fingerprint Impressions: A Method for Determining the Sex of the Manufacturers of Figurines at Teotihuacan, Mexico  
2:40 Michael W. Spence, Late Middle Horizon Obsidian Production in Teotihuacan Mexico  
2:55 Richard A. Diehl, After the Olmecs—The Post-Formative Occupation at San Lorenzo Tenochtitlan  
3:20 Dennis E. Lewarch, Spatial-Functional Structure of the Late Postclassic Settlement System in the Coatlan del Rio Valley, Western Morelos, Mexico  
3:45 Edward G. Stroh, Jr. and Richard A. Diehl, Can the Spatial Distributions of Utilitarian Ground Stone Be Used to Identify Kitchen Areas? A Test Case Involving Tula, Hidalgo, Mexico  
4:00 Phil C. Weigand, Michael Cinquino, and Douglas Holmes, Atitlan-Las Cuevas: A Postclassic Port-of-Trade in the Highlands of Western Mexico  
4:15 Robert D. Shadow and Phil C. Weigand, Highland-Barranca Contrasts in the Bolanos Valley, West Mexico  
4:30 Mark E. Harlan, Early and Middle Formative Figurines from Chalcatzingo, Morelos, Mexico  
4:45 Barbara Voorhies, Protoclassic Settlement Pattern in the Uppermost Grijalva Basin  
5:00 Elizabeth Hill Boone, The Lost Sixteenth Century Source of Herrera's Title Page Vignettes  
5:25 Grant D. Jones, The Location of Tayasal in the Light of Lake Peten Maya Ethnohistory

(35) Symposium: PALEOECOLOGY AND HUMAN ADAPTATIONS IN THE LOWER PECOS AREA

- Meeting Room No. 1 (Bal Masque)  
Organizers: Harry J. Shafer and Vaughn M. Bryant, Jr.  
Chairperson: Harry J. Shafer  
Participants:  
2:00 Harry J. Shafer, Archaeology of Hinds Cave: The 1976 Season  
2:20 Vaughn M. Bryant, Jr., Palynological Records from Hinds Cave  
2:40 J. Phil Dering, Plant Remains from Hinds Cave  
3:00 Glenna Williams-Dean, Investigations into the Ethnobotany and Cultural Ecology of Prehistoric Man in the Lower Pecos  
3:20 Kenneth Lord, Preliminary Vertebrate Faunal Research at Hinds Cave, Texas, 41VV456  
3:40 Gary L. Moore and Harry J. Shafer, Site Distribution and Function in Musk Hog Canyon, Crockett County, Texas  
4:00 Thomas R. Hester, Recent Archaeological Studies at Baker Cave, Val Verde County, Texas  
4:20 K. M. Brown, Middle Archaic Camps at Three Mile Draw  
4:40 Discussion

(36) Symposium: THE SOUTHERN PERIPHERY OF MESOAMERICA: HONDURAS AND EL SALVADOR

- Royal Salon  
Organizer and Chairperson: Paul F. Healy  
Participants:  
2:00 Howard Earnest, Preclassic Archaeology of Central El Salvador

- 2:15 Richard Crane, Ceremonial Centers and Classic Period Archaeology of Central El Salvador  
2:30 William R. Fowler, Jr., A Definition of the Postclassic Period of Central El Salvador  
2:45 Nedenia C. Kennedy, On the Frontier at Playa de los Muertos, Honduras  
3:00 James J. Sheehy, Archaeological Investigations at Travesia, Honduras: A Preliminary Report  
3:15 Ilene Wallace, Polychrome Ceramics in the Valle de Naco and their External Relationships  
3:30 John Henderson, Northwestern Honduras and the Eastern Maya Frontier  
3:45 Richard Agurcia, The Figurines of Playa de los Muertos, Honduras  
4:00 Vito Veliz R., Ancient Human Footprints in Guaimaca, Honduras  
4:15 Jeremiah Epstein, Some Problems in Bay Island Prehistory  
4:30 Paul F. Healy, The Archaeology of Northeast Honduras: Preliminary Report on the 1975 and 1976 Research  
4:45 Discussants: Doris Z. Stone, Wolfgang Haberland, Claude F. Baudez, and Stanley Boggs

(37) General Session: ARCHAEOLOGICAL METHOD AND THEORY, PART II

- Terrace Room No. 2  
Chairperson: Merrilee H. Salmon  
Participants:  
2:00 Wesley C. Salmon, New Models of Scientific Explanation  
2:25 Merrilee H. Salmon, The Systems Theory Approach to Explanation in Archaeology  
2:50 A. Colin Renfrew, The Potential of Catastrophe Theory for Archaeology  
3:15 Michael W. Graves, Archaeological Surface Deposit Methodology  
3:40 Marilyn C. Stewart, Archaeological Pits: A Research Design and a Typology  
4:05 Andrew L. Christenson, Efficiency, Maximization, and Population Pressure: Some New Light on Some Old Concepts

FRIDAY EVENING, APRIL 29

- 8:00- RECEPTION FOR NEW MEMBERS  
9:00 Terrace Room No. 2  
Present and past officers of the Society greet new members and members attending their first annual meeting  
9:00 SOCIETY OF PROFESSIONAL ARCHAEOLOGISTS  
Meeting Room No. 1  
Business Meeting

SATURDAY MORNING, APRIL 30

- (38) Symposium: CONFERENCE ON MESOAMERICAN ETHNOHISTORY: CODICES AND MANUSCRIPTS, PART I
- Royal Salon  
Organizer and Chairperson: Nancy P. Trolke  
Participants:  
9:00 Marta Foncarrada, Cacaxtla Paintings and Their Calendrical Signs  
9:25 Linda Schele, The Bundle in Maya Hieroglyphics and Iconography  
9:50 Elizabeth P. Benson, Representations of Pottery in Maya Art  
10:15 Merle Greene Robertson, A Correlation Between the Codex Tro-Cortesianus and Palenque's East Subterraneo  
10:40 Virginia Elizabeth Miller, A Reinterpretation of Maya "Gestures of Submission"  
11:05 Javier Noguez, The Tira de Tepechan  
11:30 Tim Knab, Metaphors and Meanings of Classic Aztec

Part II: See Saturday afternoon, Session 48

- (39) Symposium: COMMODITY FLOW AND POLITICAL DEVELOPMENT IN THE ANDES: PART I
- Tulane Room  
Organizers and Chairpersons: David L. Browman and Karen O. Bruhns  
Participants:  
8:00 R. A. Benfer, John W. Greer, Alice N. Benfer, and Frederic A. Engel, Ecologic and Demographic Patterns at La Paloma, a Preagricultural Lomas Village  
8:20 Emil Peterson, Cotocollao: A New Agricultural Formative Village in Highland Ecuador  
8:40 John W. Rick, Preceramic Hunters of the Central Peruvian Puna  
9:00 Darwin D. Horn, Animal Utilization in the Lake Titicaca Basin (Chiripa)  
9:20 Carol J. Mackey, Llama Herding in the Chimu State  
9:40 Break  
10:00 William H. Isbell, Redistribution Economies: Garagay and the Chavin Sphere  
10:20 Richard Burger, The Socio-Economic Basis of Chavin

- 10:40 Alana Cordy Collins, Hallucinogens and Symbolic Integration in the Chavin Civilization  
 11:00 Karen E. Stothert, Styles and Settlement of the EH-EIP Transition on the Central Coast  
 11:20 Discussion

Part II: See Saturday afternoon, Session 49

(40) Symposium: STYLISTIC ANALYSIS IN ARCHAEOLOGY

Terrace Room No. 1  
 Organizers: Haree L. Deutchman and Stephen Plog  
 Chairperson: Stephen Plog  
 Participants:

- 9:00 Haree L. Deutchman, The Use of Discriminant Analysis to Interpret Ceramic Design Element Variability  
 9:20 Jeff Hantman and Kent Lightfoot, Analysis of Ceramic Design—An Example of Micro-serialization  
 9:40 Tony Klesert, Analysis of Intrasite Ceramic Design Variability  
 10:00 Robert Neily, Spatial Scaling of Stylistic Variability: A Synthetic Approach  
 10:20 Break  
 10:40 Stephen Plog, Explanations of Ceramic Design Variability in the Chevelon Region, Arizona  
 11:00 Linda Popelish, Stylistic Analysis of Anasazi Rock Art from Canyon del Muerto, Arizona  
 11:20 David Braun, Ceramic Style Variability During the Middle-Late Woodland Transition in Western Illinois  
 11:40 Jerome A. Voss, Stylistic Analysis and Organizational Change: A European Example  
 12:00 Discussant: William Longacre

(41) General Session: SOUTHWESTERN ARCHAEOLOGY, PART I

Presidential Salon  
 Chairperson: David Breternitz  
 Participants:

- 8:45 T. J. Ferguson and William A. Dodge, Archaeological Investigations at Pescado Springs, Zuni Indian Reservation, New Mexico  
 9:00 Karen R. Adams, Site Catchment Analysis of Wild Plant Resources in the Heavily Overgrazed Rio Puerco Valley of New Mexico  
 9:15 Sally Jane Kleiner, Ornaments at Salmon Ruins, San Juan County, New Mexico  
 9:30 Linda S. Cordell, Late Anasazi Hunting: Inferences from the Tijeras Pueblo Fauna  
 9:45 Charles H. Miksicek, The Prehistoric Subsistence Ecology of the El Morro Valley, New Mexico  
 10:00 Michael E. Whalen, Aspects of the Pithouse-to-Pueblo Transition on the Periphery of the American Southwest  
 10:25 Gordon Bronitsky, Mass Production and Cost Reduction  
 10:50 James A. Neely, Thomas E. Davidson, Hugh McKerrell, and Robert J. Schneck, Neutron Activation Analysis and Mesa Verde-Chaco Canyon Ceramic Trade: New Light on Old Problems  
 11:15 Jeffrey L. Eighmy, Logistic Trends in Southwest Population Growth

(42) General Session: HISTORIC ARCHAEOLOGY

Meeting Room No. 1 (Bal Masque)  
 Chairperson: Frederick Gorman  
 Participants:

- 8:00 Frederick Gorman, Problem-Oriented Research in Historical Archaeology: Industrial Organization of Technology and Labor in Eighteenth Century Glass Manufacturing  
 8:25 Timothy W. Jones, Economic Disparity at Kanaka Village  
 8:40 Charles C. Kolb, The Eriez Indians: An Archaeological and Ethnohistorical Reevaluation  
 8:55 Kathleen A. Deagan, A Subsurface Survey of Downtown St. Augustine, Florida  
 9:10 Susan N. Mayer, Niantic-European Contact at Fort Ninigret, Rhode Island  
 9:25 Michael B. Schiffer, The Reuse Project

(43) General Session: CULTURAL RESOURCE MANAGEMENT

Meeting Room No. 1 (Bal Masque)  
 Chairperson: Mark A. Grady  
 Participants:

- 10:40 C. Melvin Aikens, Problems of Archaeological Site Survey in Heavily Forested Regions: Seeing the Ground and Looking in Likely Places in the Woods of Western Oregon  
 11:05 Bettina H. Rosenberg, The Corporate View of Cultural Resource Management  
 11:20 Ann A. Loose, The Bureau of Land Management, Cultural Resources, and Contracting  
 11:35 E. Pierre Morenon and Mark A. Grady, Conservation Archaeology, Middle Range Theory, and the Prediction of Past Land-Use Patterns  
 11:50 William A. Dodge and T. J. Ferguson, The Zuni Archaeological Enterprise: A New Concept in Conservation Archaeology

(44) General Session: ARCHAEOLOGICAL STUDIES IN OSTEOLOGY

Meeting Room No. 2  
 Chairperson: Margaret E. Hamilton

Participants:

- 8:00 Margaret E. Hamilton, Human Sexual Dimorphism and Subsistence Patterns in the Archaeological Record  
 8:25 Thomas K. Black, III, Discriminant Functions on the Dentition as an Aid to Sexual Diagnosis of Human Skeletal Remains  
 8:40 G. Wessen, F. H. Ruddy, C. E. Gustafson, and H. Irwin, Bone Strontium and Barium Content as Indicators of Diet and Environment  
 9:05 D. W. Von Endt, D. J. Ortner, and A. I. Stix, Environmental Factors that Affect the Preservation of Bone in Faunal Assemblages  
 9:20 Stanley J. Olsen, The Status of Faunal Analysis in the People's Republic of China

(45) General Session: ARCHAEOLOGY OF THE GREAT BASIN AND THE WEST

Meeting Room No. 2  
 Chairperson: William H. Adams

Participants:

- 10:45 A. V. Eggers, R. W. Robinson, and Mark Q. Sutton, Evidence of Early Man in the Western Mojave Desert, California  
 11:00 Robert L. Bettinger, Multivariate Statistical Analysis of Regional Settlement-Subsistence Systems in Owens Valley, Eastern California  
 11:15 Max G. Pavesci, An Archaic Burial Pattern in Idaho  
 11:30 Wakefield Dort, Jr. and Susanne J. Miller, Geology and Archaeology of the Wasden Site, Eastern Snake River Plain, Idaho  
 11:55 William H. Adams, Ethnoarchaeology of Silcott, Washington: A Case Study  
 12:20 Jonathon E. Ericson, Chemical Characterization of California Obsidian: Isolating Exchange Systems

(46) Symposium: ANALYTICAL APPROACHES IN PREHISTORIC ECONOMICS

Terrace Room No. 2  
 Organizers: Van A. Reidhead and W. Frederick Limp  
 Chairperson: Van A. Reidhead

Participants:

- 8:30 Philip L. Kohl, The Balance of Trade in Southwest Asia in the Mid-Third Millennium: A Structural Analysis  
 8:50 Mark F. Seeman, A Location Analysis of Hopewell Sites in the Eastern United States  
 9:10 Michael A. Jochim, Economic Strategies in the Upper Rhine Mesolithic  
 9:30 Discussants: Kent V. Flannery, Harold K. Schneider  
 9:50 Break  
 10:10 Curtis Runnels, Economic Man in the Prehistoric Aegean: 8,000 Years of Andesite Exploitation  
 10:30 Arthur S. Keene, Economic Optimization Models and the Study of Hunter-Gatherer Subsistence Settlement Systems  
 10:50 Van A. Reidhead, Labor and Nutrition in Food Procurement: Did Prehistoric People Optimize?  
 11:10 W. Frederick Limp, The Economics of Agricultural Dispersion  
 11:30 Discussants: Kent V. Flannery, Harold K. Schneider

(47) General Session: MAYA ARCHAEOLOGY I

Imperial Salon  
 Chairperson: Rosemary Sharp

Participants:

- 9:00 Richard M. Rose, Mushroom Stones and the Maya Ball Game  
 9:15 Arnold Pickman, Classic Maya Social Structure as Inferred from Mortuary Practices  
 9:30 Rosemary Sharp, Trading Chiefs to Warring Kings: The Political Nexus of Symbolic Forms During the Mesoamerican Epiclassic Period in Northern Yucatan  
 9:55 Norman Hammond, Second to Fourth Millennium B.C. Radiocarbon Dates for the Maya Lowlands  
 10:10 Jay K. Johnson, Typological Structure in Maya Lithic Analysis: A Historical Perspective  
 10:35 Jack D. Eaton, Ancient Agricultural Farmsteads in the Rio Bec Region of Yucatan  
 11:00 Elizabeth A. Graham, Archaeology in the Stann Creek District, Belize, Central America  
 11:25 Maynard B. Cliff, Late Preclassic Burial Patterning at the Site of Cerro Maya, Northern Belize: Preliminary Results

SATURDAY AFTERNOON, APRIL 30

(48) Symposium: CONFERENCE ON MESOAMERICAN ETHNOHISTORY: CODICES AND MANUSCRIPTS, PART II

Royal Salon  
 Organizer and Chairperson: Nancy P. Troike

**Participants:**  
 2:00 Kornelia Kurbjuhn, A Comparison of Planets in the Codices Laud, Fejervary-Meyer and Borgia  
 2:35 Gordon Whittaker, From Zapotec Hieroglyphics to the Mixtec Codices  
 2:50 Nancy P. Troike, Rulership Ceremonies in Mixtec Codices  
 3:15 Carlos B. Arostegui, Marriage, Alliance, and Succession in Precolumbian Mixtec Society  
 3:40 John M. D. Pohl, The Significance of Human Sacrifice in the Codex Zouche-Nuttall  
 4:05 Ronald Spores, Ethnographic Content of Postconquest Mixtec Codices  
 4:30 Donald Robertson, Some Mexican Pictorial Manuscripts in the Tulane University Latin American Library

(49) **Symposium: COMMODITY FLOW AND POLITICAL DEVELOPMENT IN THE ANDES, PART II**  
 Tulane Room  
 Organizers and Chairpersons: David L. Brownman and Karen O. Bruhns

**Participants:**  
 2:00 Gordon C. Pollard, Villages, Systems, and Economics in the South Andes  
 2:20 David L. Brownman, D. Bennett, and N. Clarke, Entrepreneurs and Tiwanaku Economic Spheres of Influence  
 2:40 Thomas P. Myers, Prehistoric Trade Patterns in the Amazon Basin  
 3:00 Izumi Shimada and Melody Shimada, The Economy of Urban Context at Moche V Pampa Grande: Commodity and Labor Flow  
 3:20 Break  
 3:40 James S. Kus, Chimu Irrigated Agriculture  
 4:00 Clark L. Erickson, Subsistence Implications and Botanical Analysis at Chiripa  
 4:20 Raphael X. Reichert, Status Indices in the Recuay Ceramic Goods  
 4:40 Dwight T. Wallace, A Later Ceremonial Road System in Chincha: Symbolic and Political Implications  
 5:00 Frederic A. Engel, Change in the Settlement Patterns Along the Arid Coast of Peru from 10,000 B.P. to the Colonial Period  
 5:20 Discussion

(50) **Symposium: ARCHAEOLOGY AND NATIONAL FOREST LAND-USE PLANNING**  
 Meeting Room No. 2  
 Organizers: Dee F. Green and Ernestine Green  
 Chairperson: Ernestine Green

**Participants:**  
 2:00 Ernestine Green and Dee F. Green, Some Implications of Land-Use Planning for Archaeological Method and Theory  
 2:20 Leslie E. Wildesen, A Case Study of the Badger-Jordan Planning Unit, Mt. Hood National Forest, Oregon  
 2:40 L. Mark Raab, Archaeological Sample Surveying and a Predictive Model of Site Location in the Ouachita National Forest, Arkansas  
 3:00 Bruce Donaldson, Lessons From the White Mountain Planning Unit: A Small-Sample Survey Design for Large Areas  
 3:20 Jon Scott Wood and Fred Plog, Land-Use Planning and Regional Research Potential: The Apache-Sitgreaves Example  
 3:40 Robert Tippeconnic, Cultural Resources and Land-Use Planning: The Land Manager's Perspective  
 4:00 Discussants: Mark A. Grady, W. James Judge, Evan I. DeBloois

(51) **General Session: SOUTHWESTERN ARCHAEOLOGY II**  
 Presidential Salon  
 Chairperson: David B. Madsen

**Participants:**  
 2:00 Pat H. Stein, Recent MNA Investigations in the Lower Gila Drainage: New Data on Hohokam Subsistence Strategies  
 2:15 Marvin D. Jeter, Prehistoric Processes in the Prescott Region, Westcentral Arizona  
 2:30 Robert Layhe, A Multivariate Approach to Population Estimates and Change, Black Mesa, Northeastern Arizona  
 2:45 Margie Green, Analysis of Chipped Stone Raw Materials for Black Mesa  
 3:00 S. L. McAllister, Artifact Inventories as a Predictor of Sedentism on Black Mesa  
 3:15 Richard Ciolek-Torrello, Reconstructing Prehistoric Activities at Grasshopper Pueblo  
 3:30 Stephanie M. Whittlesey, Status and Death at Grasshopper Pueblo: A Theoretical Excursion  
 3:45 J. Jefferson Reid, Moving On: The Problem of Abandonment as Seen from Grasshopper Pueblo  
 4:00 Patricia Crown Robertson, Distribution and Function of Preaggregation Communities in the Grasshopper Region  
 4:15 Frederick L. Briuer, 9,000 Years of Cultural and Noncultural Deposition Processes in Caves and Rockshelters of Chevelon Canyon, Arizona  
 4:30 Jonathan E. Reyman, Room 44, Wupatki: Reaping False Profits  
 4:55 David B. Madsen, Pollen Analysis at Agricultural Village Sites: A Test Case at Backhoe Village

(52) **Symposium: LOCATIONAL MODELS IN ARCHAEOLOGY**  
 Terrace Room No. 2

**Organizers:** Alan S. Downer, Jr. and Carole L. Crumley  
**Chairperson:** Alan S. Downer, Jr.

**Participants:**  
 2:00 Carole L. Crumley, Space-Time Dialectics: A Short History and Prospectus of Locational Analysis in Archaeology  
 2:20 William H. Marquardt, Fundamentally Random Caterpillars: The Influence of Statistical Ecology on Archaeological Descriptions of Settlement  
 2:40 Alan S. Downer, Jr., Central Place Models in Archaeology or What to do with a Hexagonal Lattice  
 3:00 Eric N. van Hartesveldt, Zipf Reconsidered: A Replication of the Rank-Size Model  
 3:20 Donna C. Roper, Site Catchment Analysis: An Overview  
 3:40 Ervan G. Garrison, Dimensional Analysis of Variance and Locational Analysis  
 4:00 Paul R. Green and Alan S. Downer, Jr., Network Approaches to Settlement Archaeology  
 4:20 Discussion

(53) **General Session: ARCHAEOLOGY OF THE SOUTHEASTERN UNITED STATES**  
 Terrace Room No. 1  
 Chairperson: William O. Autry, Jr.

**Participants:**  
 2:00 Reynold J. Ruppe, Analysis of Material from Venice, Florida, Underwater Archaeological Site  
 2:15 Tim A. Kohler, The McKeithen Site: Preliminary Report  
 2:30 Barbara A. Purdy, Evidence of Late Pleistocene Human Occupation in Florida  
 2:45 Karl T. Steinen, Archaeological Investigations in Early County, Georgia: A Settlement Model for Kolomoki  
 3:00 Elisabeth Sheldon and Marguerita Cameron, The Black Belt Prairie of Alabama: Feast or Famine  
 3:25 Jefferson Chapman, Early Archaic Period Research in the Lower Little Tennessee River Valley: Retrospect 1977  
 3:40 C. Roger Nance, Woodland and Mississippian Settlement Patterns near the Upper Alabama River, Alabama  
 4:05 Patricia A. Criddlebaugh, Penitentiary Branch: Problems of Excavation and Analysis of an Archaic Shell Midden  
 4:20 Carl Kuttruff, The Mound Bottom and Brown Pack Sites, Tennessee  
 4:35 Michael J. O'Brien, Intrahouse Analysis of Artifacts from a Large Mississippian Settlement in Central Tennessee  
 4:50 Donna Dean, Mound Bottom: An Environmental Analysis  
 5:05 William O. Autry, Jr., Human Burials from W.P.A. Investigations at Mound Bottom, Tennessee (40CH8)  
 5:20 Sharon I. Goad, Exchange Networks in the Southeastern United States

(54) **Symposium: JAPANESE PREHISTORY: ITS CONTRIBUTIONS TO OLD AND NEW WORLD RESEARCH**  
 Meeting Room No. 1 (Bal Masque)

**Organizer and Chairperson:** William M. Hurley  
**Participants:**  
 2:00 William M. Hurley, Early Jomon (ca. 6000-3500 B.C.) Villages in Hokkaido and the Origins of Sedentism in Northern Japan  
 2:20 Henry Stewart, The Transition from Paleolithic to Neolithic in Japan  
 2:40 Fumiko Iwasa-Smith, Chopper/Scrapers, Unifacial Tools, and Bifacial Foliates in Pleistocene Japan and the New World  
 3:00 Peter Bleed, The Discipline that Wasn't: Archaeology in Premodern Japan  
 3:20 Gary Crawford, Studying Jomon Palaeoethnobotany  
 3:40 Patricia Hitchins, The Bronze-Iron Age of Japan in Perspective: A Comparison with Contemporaneous Cultural Development in East Asia  
 4:00 Michele A. Salerno, A Thin-section Analysis of Jomon Pottery from Three Sites in Japan  
 4:20 Discussant: Chester Gorman

(55) **General Session: MAYA ARCHAEOLOGY II**  
 Imperial Salon  
 Chairperson: Susanna M. Ekholm

**Participants:**  
 2:00 Susanna M. Ekholm, The Necropolis Aspect of the Southwestern Maya Site of Lagartero, Chiapas  
 2:15 Joseph W. Ball, The Ceramics of Chinkultic, Chiapas, Mexico: An Interim Report  
 2:40 Gary W. Pahl, Contacts Between Maya Frontier Centers  
 3:05 Suzanne K. Fish, Cultigens, Cultivation, and Chronology: Palynology at Edzna  
 3:30 Richard R. Wilk and Livingston D. Sutro, "Taking the Plunge," Estimating Population at Tikal on the Basis of Water Resources  
 3:45 Arthur Vokes, Shelling Out: The Role of Mollusks in a Postclassic Maya Economy  
 4:00 William J. Folan and George D. Allen, Fruit, Fiber, and Bark: The Social Organization of a Maya Urban Center, Cobá, Quintana Roo, Mexico  
 4:15 Christopher Jones, Research at Quirigua, Guatemala: The Site-Core Program  
 4:30 Wendy Ashmore, Research at Quirigua, Guatemala: The Site-Periphery Program

## ABSTRACTS OF ORGANIZED SYMPOSIA

(1) MIMBRES PREHISTORY: RESEARCH OF THE MIMBRES FOUNDATION IN SOUTHWESTERN NEW MEXICO. The papers synthesize three years of work in the Mimbres Valley. Various facets of a regional research design combining survey and excavation of sites spanning an 1100-year period are considered. The relationship between population dynamics and resource use are considered in several different ways. Evidence for intraregional trade and the effects of external cultural events are evaluated. New data on several phases are also detailed.

(2) CHRONOLOGICAL FRAMEWORKS OF MESOAMERICA: NEW DATA ON CERAMIC SEQUENCES. This symposium has been organized to present new data on ceramic chronologies from recent field research in Mesoamerica. Refinements and elaborations of technique and some basic assumptions about chronology will be examined. Central Mexican sites to be discussed are Teotihuacan, Xochicalco, Tula, Chalcatzingo, Xochipala, and Caxtla; and from the Maya region, Los Chuchumatanes, Guatemala.

(3) THE POTENTIAL OF DEBITAGE IN CULTURAL INTERPRETATION. Debitage comprises a major portion of the total artifact assemblage at most prehistoric sites and may even be the only type of artifact recovered from a locus. As such, it also usually occurs in sufficient quantity to support statistical treatment. Yet debitage has been cursorily examined in most artifact analyses with interpretation restricted to the narrowest technological levels. Our goal in this symposium is to begin to explore the vast potential of this category for cultural interpretation. Papers presented here will utilize debitage data to gain insight into a wide range of questions of archaeological interest such as activity location, function, and chronology.

(4) VOLCANISM AND HUMAN HABITATION IN THE NEW WORLD. Depending on its nature and magnitude, a volcanic eruption can have major detrimental or beneficial effects on human habitation, or the effects can be minor and brief. The effects of volcanic activity on environments ranging from arctic to tropical and on societies ranging from band to state are examined by symposium participants. A multidisciplinary approach is emphasized, with contributions from archaeology, geology, paleontology, geography, and zoology. Geographic coverage extends from Alaska to Central America.

(7, 16) STONE AGE ARCHAEOLOGY IN MEDITERRANEAN EUROPE. Research in the past decade has greatly expanded knowledge of stone age archaeology in Mediterranean Europe. New methods, techniques, and theories, a greatly enriched corpus of data, and a growing international body of scholars have led to many reformulations of understandings of the course of prehistory and the factors affecting it. This symposium brings together for the first time an international group of scholars who have been doing innovative research in the stone age archaeology of southern Europe.

(8, 9, 21, 22) EARLY SEDENTARY SETTLEMENTS IN THE MOIST TROPICS OF NORTHERN SOUTH AMERICA. Part I: FIRST INHABITANTS OF THE TROPICAL ALLUVIUM OF NORTHERN SOUTH AMERICA; Part II: THE NATURE OF VALDIVIA AND THE FORMATIVE OF SOUTH AMERICA; Part III: EVIDENCE OF POPULATION MOVEMENTS OUT OF THE MOIST TROPICS OF SOUTH AMERICA; Part IV: INTENSIFICATION OF AGRICULTURAL SYSTEMS IN THE NEW WORLD. WAS IT A UNITARY PHENOMENON? In the 1950s it was thought that the tropical forest areas of South America lagged behind the Central Andes in terms of the appearance of fully effective agricultural systems. Julian Steward, in the Handbook of South American Indians, presented a model for the flow of cultural activity down through the Northern Andes and out through Venezuela into the Guyanas, and from there spreading widely over the Amazon Basin. The specific details of this model have been questioned, but a general notion of cultural flow from the Andes into the moist lowlands has prevailed, and to a large degree continues to prevail in the literature. This notion, though widespread, is not supported by the data from research along the major rivers of this zone. Wherever intensive archaeological research has been carried out, evidence of large, stable communities with complex and artistically elaborate ceramics appear early, usually before 2000 B.C., and often as early as 4000 B.C. These data when summarized argue strongly for a very different picture for cultural development, namely that intensive and highly productive cultural systems appear earlier in the moist tropics than anywhere else in the New World. That the appearance of these new cultures was marked by an elaboration of religious system and iconographically complex art, it could be inferred from these data that the beginnings of sedentary agricultural life in both Mexico and Peru were stimulated by colonization from the so-called Intermediate Area. Given the amount of data that supports this position, we feel that it has been given too little consideration by New World archaeologists. It is the purpose of these symposia to change the prevailing opinion.

(10) THE SOUTHWESTERN ANTHROPOLOGICAL RESEARCH GROUP: RESULTS TO DATE. Results of six years' research by members of the Southwestern Anthropological Research Group are described. Problems that have arisen in the course of the effort are

identified. A research design to be followed during the next several years is presented. The symposium summarizes the results of a week-long working conference held last Spring.

(11) MAYA INTELLECTUAL ACHIEVEMENTS IN THE CLASSIC AND POSTCLASSIC. The fields of architecture, calendrics, literature, astronomy, writing, social organization, and history as developed by the Maya during the Classic and Postclassic will be considered in this symposium. In particular, the correlation problem will be discussed from the points of view of history and astronomy both in the Classic and the Postclassic. Studies of architecture and literary traditions reveal alliances between cities which are otherwise not readily observed. Epigraphic studies identify emblem glyphs and patterns of elite social organization. All these studies lead to further decipherment of the inscriptions and to a better understanding of Maya civilization.

(12) THE ARCHAEOLOGY OF THE VIRGIN ISLANDS NATIONAL PARK. Research projects were conducted on St. John, United States Virgin Islands, in 1969, 1970, and 1976. The archaeology of this area is relatively poorly known and reported to date. This symposium has been organized to present the results of recent work in this area by National Park Service personnel and under contract to the service. Topics to be covered include aboriginal and historic ceramic typology, excavations and stratigraphy, site distribution, human remains, and faunal remains.

(13) BONE TECHNOLOGY: EXPERIMENTATION, ASSEMBLAGES, AND NON-HUMAN MODIFICATION. The study of bone technology is relatively recent development within the field of archaeology. Extensive experimentation is being conducted at several schools in order to duplicate and document archaeological bone material identified as culturally modified. A wide spectrum of studies are being conducted, including analyses of bone breakage during butchering, flaking qualities and associated debris, bone quarrying, tool manufacture, and breakage patterns of culturally modified and non-culturally modified bone. Many of the assemblages being described are from the Paleo-Indian period and represent butchering tool kits. The kits vary from site to site, the same functions being performed but different bones selected for the tools. Discussions are centered on the initial stages of study and the need for further research.

(15) COMPUTER SIMULATION AS ARCHAEOLOGICAL MODEL BUILDING. Computer simulation has lately come of age as an effective research tool in archaeological model building. Researchers have developed simulation models dealing with a wide variety of archaeological problems, including sampling design, assemblage formation, and postdepositional assemblage modification. This symposium will review these applications, focusing on data requirements, problems of operationalization, verification, and use of results.

(18) CULTURAL RESOURCE MANAGEMENT—THE FEDERAL PROGRAMS AND THE ARCHAEOLOGISTS' EXPERIENCE. Federal legislation has greatly increased the workload of the archaeologist, requiring an involvement in surveying and excavation for state and federal projects. The symposium proposes to review the policies and procedures of some of the federal agencies most involved in cultural resource management and then have papers presented by archaeologists, who have been working with these procedures, relate their experiences and plans for the future in their state.

(23, 31) REMOTE SENSING IN MESOAMERICA. Uses of remote sensing in the location and analysis of archaeological data in Mesoamerica have lagged behind such applications in other geographical regions. Superficially this fact seems reasonable as much of the area is covered with dense vegetation. Since the development of more sophisticated sensors—ERTS, Landsat, Side-looking radar, etc.—the uses of remote sensing technology in Mesoamerican archaeology have become the focus of renewed attention. Surprisingly, the use of standard BI/wh stereophotography has revealed much new data as well, some of which is not even recoverable through use of standard ground survey techniques. Papers presented in this symposium focus on current archaeological research in Mesoamerica. The concern is with analysis of archaeological problems for which remote sensing provided the primary data collection techniques.

(24, 32) THE DEVELOPMENT OF ETHNOARCHAEOLOGY: A WORLD-WIDE PERSPECTIVE. To explain prehistoric behavior we must directly observe activities and material culture in a variety of world societies in order to comprehend the alternative ways of accomplishing the same ends and in order to test the meaning and relationships of the antecedents of any hypothesis before that hypothesis is used to predict and explain human behavior. In short, we must understand the ways in which a variety of known behavioral sets results in specific artifacts, artifact patterns, and site remains, so as to provide the archaeologist with a set of realistic and concrete inferences for testing.

(25) MISSISSIPPIAN SETTLEMENT PATTERNS. Within the last decade numerous long term regional research projects focusing on Mississippian subsistence-settlement patterns have been carried out. These studies have resulted in the formulation of fairly detailed late prehistoric settlement pattern models for a wide variety of different geographical-environmental situations within the eastern deciduous woodlands. Many of these studies are still unpublished, and very few have ever been presented at the same time within the context of an organized symposium. The symposium would, therefore, serve to provide detailed summaries of the settlement patterns of late prehistoric (A.D. 800-1400) human populations over much of the eastern United States.

(26) CULTURAL RESOURCE MANAGEMENT AND ARCHAEOLOGICAL RESEARCH—IN PRACTICE. Cultural resource management (CRM) requires both managers and archaeologists to function with varied organizational settings and to develop research designs and work programs in new and innovative ways. The symposium addresses practical problems of cultural resource management and research design within organizational and conservation contexts.

(27) HOLOCENE ENVIRONMENTS AND HUMAN POPULATIONS ON THE PECOS RIVER, NEW MEXICO. The Pecos River presently transects an area exhibiting limited physiographic and biotic variability. Yet recent multidisciplinary archaeological research has demonstrated a diversity in past environments and human adaptive strategies within the Pecos drainage. The de-emphasis on narrowly focused river basin studies and an increased concern with the interdigitation of environmental and cultural factors at the interregional level has resulted in the recognition of a pattern of broad-spectrum adaptation along the Pecos River during the Holocene. The methodologies, techniques, and results of current investigations into past human activities have expanded our view of Pecos River archaeology and are the subjects of this symposium.

(28) PRESENT ARCHAEOLOGICAL RESEARCH IN LOWER CENTRAL AMERICA. The purpose of this symposium will be to bring together archaeologists working in Lower Central America to present and discuss present research. We are defining Lower Central America as ranging from central Honduras/eastern Salvador to and including Panama. The opportunity will be presented to discuss regional problems and to refine the substantive and systematic prehistory of Lower Central America as a whole.

(33) RECENT RESEARCH IN LEVANTINE PREHISTORY. The symposium deals with problems related to prehistoric adaptations in the Levant. Adaptations of Mousterian through Pre-Pottery Neolithic cultures are reviewed. Topics covered include lithic analysis, technological adaptation, settlement patterns, subsistence strategies, and spatial analysis. A number of papers offer modeling procedures which should be of considerable interest to New World archaeologists.

(35) PALEOECOLOGY AND HUMAN ADAPTATIONS IN THE LOWER PECOS AREA. Recent archaeological, paleobotanical, and paleoecological research in the Lower Pecos area has yielded much new information on prehistoric human ecology in southwest Texas. This research has been carried out at four localities: Hinds Cave, a large dry rockshelter on the Pecos River drainage excavated by Texas A&M University and funded by National Science Foundation; Baker Cave, a large dry rockshelter on the Devil's River drainage tested by University of Texas at San Antonio; Musk Hog Canyon, a small tributary of the Pecos River, surveyed by the Texas Archeological Society; and Sanderson Canyon, a moderate tributary of the Rio Grande River, surveyed and tested by the Texas Archeological Survey. Information from these research projects will be presented by the participants including objective, techniques, and preliminary findings. Specific studies that are reported include material culture, plant use, faunal procurement, culture history, diet, and pollen analysis.

(36) THE SOUTHERN PERIPHERY OF MESOAMERICA: HONDURAS AND EL SALVADOR. The Republics of Honduras and El Salvador lie within a geographic zone of upper Central America which is critical to the understanding of New World prehistory. The prehistoric "frontier" between Mesoamerica and the Intermediate Culture Area transects or borders upon these two republics. In recent years an upsurge in archaeological field research in these diverse areas has begun to clarify the interaction and relations between the more advanced Mesoamerican civilizations, such as the Classic Maya, with those lesser developed cultures and emergent chiefdoms of a Central American configuration. The symposium focuses upon some recent results of these research efforts in Honduras and El Salvador, and discusses the implications of cultural contact, interaction, and evolution along the southern periphery of Precolumbian Mesoamerica.

(38, 48) CONFERENCE ON MESOAMERICAN ETHNOHISTORY: CODICES AND MANUSCRIPTS. This symposium will focus upon documentary materials concerning the high culture areas of native Prehispanic Mexico and Guatemala, and will show the relationship of these data to the analysis and solution of both Preconquest and Postcontact problems. The participants, who are from a number of different countries (U.S., Mexico, Germany) have been invited in order to reflect a broad coverage of current research in this complex, interdisciplinary field. Their papers will demonstrate how written and pictorial manuscript sources may be utilized to resolve a wide variety of archaeological, ethnographic, and linguistic problems.

(39, 49) COMMODITY FLOW AND POLITICAL DEVELOPMENT IN THE ANDES. Research focusing on various types of economic data indicates wider ranges of political phenomena and earlier development of some features than generally believed. Work both at La Paloma on the coast and Pachamachay in the puna indicates the emergence of sedentary population units with indications of some regional stratification possibly as early as 4000 B.C. Consideration of commodity flow and resource management form the basis of analysis for the symposium. Participants take one of two general approaches—either the identification and discussion of the flow of particular commodities and reconstruction of the networks of commodity flow, or a discussion and an analysis of how the economic resources and their control functioned in the maintenance and specific functioning of a polity.

Examples of the first orientation might include the papers on llama trade caravans and the flow of certain prestige goods (such as ceramics, hallucinogenic drugs, etc.); examples of the second would include the use of labor flow analysis within a site, and the functioning of redistribution and rite size hierarchies in the Chavin empire.

(40) STYLISTIC ANALYSIS IN ARCHAEOLOGY. Recent studies concerning several aspects of style will be discussed. Classification systems for stylistic variability will be presented and methods of statistical analysis evaluated. Several papers will focus specifically on the use of stylistic change through time to date prehistoric sites. Finally, explanations of stylistic variability through space will be discussed.

(46) ANALYTICAL APPROACHES IN PREHISTORIC ECONOMICS. The papers of this symposium attempt to explain different aspects of prehistoric resource utilization using economic models. Although the models vary considerably, as a group they are heavily dependent upon formal analysis and decision making theory for their development. The models are often compared with specific sets of archaeological and ethnographic data, emphasizing actual test results. Discussions of the papers will be contributed by an archaeologist and an economic anthropologist.

(50) ARCHAEOLOGY AND NATIONAL FOREST LAND-USE PLANNING. As a part of its nationwide land-use planning effort, the U.S. Forest Service is, in many areas of the country, including documentation of the cultural resource. This symposium brings together, for the first time, a group of archaeologists who have been involved in that effort nationwide. Since land-use planning units involve literally hundreds of thousands of acres, the archaeologists concerned have had an opportunity to look at the archaeological resource from a wide perspective seldom attained in past studies.

(52) LOCATIONAL MODELS IN ARCHAEOLOGY. Recently there has been an increasing use of geographic models and analytical techniques in the archaeological study of settlement. As with any new borrowing from another discipline the quality of these applications has been variable. Nearly all of these applications have failed to fully consider the specific restraints on the geographic models in modern contexts and what the consequences of these are for their archaeological application. Here we will explicitly consider several major models and techniques, the constraints on these, both theoretical and practical, and the relevance of these to their archaeological applications.

(54) JAPANESE PREHISTORY: ITS CONTRIBUTIONS TO OLD AND NEW WORLD RESEARCH. The view that Japan is the window into Asia is being modified by recent research in Korea, Southeast Asia, and Japan. Research in Japan is producing cultural patterns that suggest that preconceived notions concerning its prehistory are being greatly modified. This process of modification is now contributing to our understanding of events outside the Japanese archipelago. This symposium will briefly focus on Japanese research in an attempt to explain how these data aid or alter our world view of prehistory.

#### RECORDING SESSIONS

Persons wishing to record scholarly sessions or portions of sessions should follow normal scholarly convention and obtain the permission of the person being recorded and of the chairman of the session at which recording is to be done. There should be no publication of such recorded material without following established procedures regarding permission and citation.

## ABSTRACTS OF PAPERS\*

Accola, Richard M. (Texas-Austin) A PRELIMINARY APPLICATION OF X-RAY DIFFRACTION ANALYSIS TO THE STUDY OF NICoya POLYCHROME CERAMICS. Cultural unity in the Nicoya subarea of Costa Rica has long been assumed on the basis of the distribution of certain polychrome ceramic types at various time periods. It is not known whether these distributions reflect local participation in a widespread socioeconomic system or rather the influence of "centers" over other areas. This question can be best addressed by means of componential analysis of samples of a single type taken from different areas. X-ray powder diffraction analysis, being relatively inexpensive and easy to run, would appear to be an appropriate method. Tests were run on a small sample of one type of widely distributed ceramics, Mora Polychrome from the Middle Polychrome period (ca. A.D. 800-1200), in order to determine the suitability of the method for this kind of study. (28)

Ackerman, Robert E. (Washington State) ARCTIC AND SUB-ARCTIC. Historically, three periods of investigation of Arctic and Sub-Arctic peoples are discernable: (1) exploratory—Russian Contact to the museum collecting activities of Boas, Murdoch, Nelson, Rink—emphasis on material culture as adaptation to harsh environment; (2) early ethnographic—investigations of Birket-Smith, de Laguna, McKennan, Jenness, Turner, and others with social and intellectual aspects of culture added to continuing interest in material culture; (3) late or modern ethnographic—shift of interest away from ethnographic present to study of modernization of Arctic and Sub-Arctic villagers. Early archaeology in the region was a phenomenon contemporary with period (2) where the archaeologist experienced the same cultural impact as the ethnologist. The approach was basically ethnographic based on data from period (1) and contemporary inputs of period (2). During the modern period the shift of ethnography away from material culture and increasing sophistication in archaeological investigative procedures has stimulated archaeologists to play multiple roles of ethnographer, geologist, historian, and naturalist. The complex interplay of ethnography with archaeology (ethnoarchaeology as an aspect) though of long tradition in the northern realms, is now entering a new era with new insights. (32)

Adams, E. Charles (Museum of Northern Arizona) THE CHANGING NATURE OF ARCHAEOLOGICAL DATA, OR, HOW TO GET ALONG ON A SCARCE RESOURCE. Much recent concern in archaeology has been directed toward conservation archaeology, the preservation of archaeological resources. Little has been mentioned about the data restructuring inherent in this philosophy. Methodological and analytical tools must be developed for dealing with this new form of data if contributions to understanding and explaining culture and cultural change are to progress. (26)

Adams, Karen R. (Eastern New Mexico) SITE CATCHMENT ANALYSIS OF WILD PLANT RESOURCES IN THE HEAVILY OVERGRAZED RIO PUERCO VALLEY OF NEW MEXICO. An approach to assessing former wild plant resource availability and utility without depending on density is presented. A site is chosen and considered "home base" while literature research on human "exploitation territories" provides a reasonable boundary for the study. The geology of the area is examined and landforms delineated. A botanist describes the distribution of plants on landforms to provide a baseline from which one can work. A model to compensate for effects of overgrazing is applied. Plant species with known ethnographic uses are scored for "potential" value; then landforms are scored according to the species they support. One can evaluate wild plant resource potential between contemporaneous or noncontemporaneous sites. Models to accommodate fluctuations in climate may be applied. Limitations of this approach are discussed. (41)

Adams, R. E. W. (see Dahlin, B.) (23)

Adams, William H. (Washington State) ETHNOARCHAEOLOGY OF SILCOTT, WASHINGTON: A CASE STUDY. Various aspects of ethnoarchaeology are examined in relation to the study of a small farming community in southeastern Washington. Silcott existed from the late nineteenth to the early twentieth century as a minor node in the regional networks. The combined ethnographic, archaeological, and historical study of that community has yielded considerable insight into how Silcott functioned as a social unit. In addition, the study is in a position to contribute to the methods and theories of ethnoarchaeology, through its research on cultural materials, trade, and settlement. (45)

Adovasio, James M. (Pittsburgh) MEADOWCROFT ROCKSHELTER: RETROSPECT 1976. Meadowcroft Rockshelter is a deeply stratified multicomponent site in Washington County, southwestern Pennsylvania. The 11 well-defined stratigraphic units identified at the site span at least 16,000 years and perhaps 19,000 years of intermittent occupation by groups representing all of the major cultural stages/periods now recognized in northeastern North America. Throughout the extant sequence, the site served as a locus for hunting, collecting,

and food processing activities that involved the seasonal exploitation of the immediately adjacent Cross Creek valley and contiguous uplands. Presently, Meadowcroft Rockshelter represents one of the earliest well-dated evidences of man in the New World as well as the longest occupational sequence in the Western Hemisphere. (6)

Adovasio, J. M. (see Andrews, R. L.) (20)

Agurcia, Ricardo F. (Tulane) THE FIGURINES OF PLAYA DE LOS MUERTOS, HONDURAS. The collection of Playa de los Muertos figurines from the Middle American Research Institute of Tulane University is studied. A typology of the figurines is made based on physical attributes (paste, slip, and paint). Stylistic similarities with figurines from the northwest are seen that lend support to the view that this area of Honduras was interacting as a part of the cultural sphere of Mesoamerica during the Middle Preclassic. The customs, costumes, and coiffures of the Playa society, as reflected in the figurines, are discussed and reference is also made to the trade systems, religious practices, and level of sociocultural development of this society. (36)

Aikens, C. Melvin (Oregon) PROBLEMS OF ARCHAEOLOGICAL SITE SURVEY IN HEAVILY FORESTED REGIONS: SEEING THE GROUND AND LOOKING IN LIKELY PLACES IN THE WOODS OF WESTERN OREGON. Heavy ground cover effectively conceals archaeological remains in many forested regions, leading to difficulty in locating archaeological sites and to the frustration of data-gathering schemes that seek to obtain representative information through use of internal or random sampling techniques. A highly judgmental approach, taking advantage of good visibility where it may be found, appears to be the only reasonable mode of investigation. The use of aerial photos and detailed topographic maps is a valuable aid to data collection. An element of randomization in survey coverage may be achieved through examination of man-made clearings in a variety of terrains. (43)

Aldenderfer, Mark S. (Pennsylvania State) THE COMPUTER SIMULATION OF ASSEMBLAGE FORMATION MODELS IN HUNTER-GATHERER ARCHAEOLOGY. One of the most important assumptions underlying much recent work in the archaeology of hunter-gatherers has been that of the "functional argument." Considerable effort has been directed at the development of quantitative methods for the discovery of "tool kits" or "activity areas" at archaeological sites. The assumption that variability in assemblages of tools primarily reflects site function, however, has not been rigorously tested, and evidence from recent ethnoarchaeological studies of hunter-gatherers demonstrates that the use and discard of tools is extremely complex. Thus quantitative methods applied to these data may or may not be capturing true functional distinctions. This paper presents a test of the "functional argument" that is based on the construction of a computer simulation of how tools "flow" through a material culture system. The simulation creates a record of sites in a region that can then be used to evaluate the ability of multivariate statistical methods to recover functional distinctions. The model operationalized by the simulation is based on ethnoarchaeological data from the Western Desert of Australia. The problems encountered in the development of the simulation will be discussed, as will the implications of this research for the study of hunter-gatherer archaeology in general. (15)

Allaire, Louis (Manitoba) FROM PREHISTORY TO HISTORY IN THE LESSER ANTILLES: THE PROBLEM OF CARIB MIGRATIONS. The paper questions the historicity of Carib migrations in northeastern South America, especially from the Guianas to the West Indies, on the basis of (1) recent chronological work on the late prehistory of the Lesser Antilles, and (2) a critical re-examination of ethnohistorical evidence in support of a migration theory (e.g., migration myths, male/female linguistic dimorphism, population distributions, etc.). Moreover, a new interpretation of the previously elusive Island Carib pottery now makes it possible to re-evaluate cultural continuities and affiliations. The question is further approached through a more specific definition of the Island Caribs as an ethnic group, especially in relation to ethnic groups in the Guianas. (21).

Allen, George D. (see Folan, W. J.) (55)

Allen, Richard K. (Western Illinois) AN EASIER WAY TO MAP MAYA RUINS. Traditional methods for mapping domestic ruins in the Maya Lowlands require different skills and more time than charting easily visible monumental buildings. Aerial views are a particularly important aid for interpretation of smaller architecture. Low oblique photographs of cleared agricultural fields taken at altitudes below 350 meters with medium format cameras clearly record low mounds with boundary walls surrounding them. Narrow streets or walkways are visible between tightly packed dwelling complexes. These surface features were outlined on photographs and their coordinates digitized. The numerical image was then rectified to planimetric perspective. The resulting map is superior to a chart produced on the ground with transit and alidade. (31)

Ammerman, Albert (Stanford) A SIMULATION STUDY OF EXCAVATION STRATEGIES AT A MAASI SETTLEMENT. Simulation techniques are used to develop a comparative study of the results that would have been obtained from the excavation of a Maasi site in East Africa according to several different sampling designs and strategies. The site employed in this study is a recently abandoned pastoralist settlement where a detailed recording was made of the material remains on the site surface. (15)

\*Abstracts listed alphabetically by senior author; please see program for full citation.

Andrews, Rhonda L. (Pittsburgh) THE TEXTILE AND BASKETRY IMPRESSIONS FROM JARMO. Analysis of a series of negative impressions in clay and bitumen recovered during the excavations at Jarmo indicate the prehistoric production of both cloth and basketry at that site. Two varieties of plain woven cloth, balanced plain weave—single warp and weft, and balanced plain weave—double warp and weft, are represented, as are two of the three major subclasses of basketry. The latter includes plaiting and coiling, each represented by a single type. The technical characteristics of these "perishables" are discussed and the assemblage is compared to others in the Old and New World. (20)

Anuskiewicz, Richard (U.S. Army Corps of Engineers) THE ROLE OF THE PROFESSIONAL ARCHAEOLOGIST WITH THE U.S. ARMY CORPS OF ENGINEERS. The U.S. Army Corps of Engineers is now actively seeking to meet statutory responsibilities concerning the management of cultural resources. Federal legislative mandates such as the Preservation of Historic and Archaeological Data, Public Law 93-291, and Executive Order 11593, have propagated the urgent need for the Corps to develop a comprehensive program to manage cultural resources. The Corps has responded to this responsibility by initiating a Code of Federal Regulations (33 CFR Part 305) and by actively seeking and hiring professional archaeologists to administer their program. This paper will discuss the role of the archaeologist with the Corps. (18)

Applegarth, Susan M. (Fort Lewis) PALEOECOLOGY AND PREHISTORIC EXPLOITATION OF THE EASTERN SLOPES OF THE GUADALUPE MOUNTAINS, SOUTHEASTERN NEW MEXICO. Research undertaken along three major drainages of the eastern slopes of the Guadalupe Mountains was designed to answer a series of specific questions. Included in the areal problems to be resolved were: (1) the relationship of the specific types of sites to each other; (2) the ecological setting of the sites at the time of occupation; (3) the portion of the environment being exploited by the occupants of various sites; and (4) the relationship of the sites in the Guadalupe Mountains to those of the Greater Southwest and the Southern Plains. The area proved to be one of specialized exploitation of a major resource. Artifacts recovered from the area suggest links to the Trans-Pecos region. (27)

Arnold, Dean (Wheaton) A REVIEW OF ETHNOARCHAEOLOGICAL STUDIES IN MESOAMERICA. This review of ethnoarchaeological studies in Mesoamerica focuses on their contributions to archaeological method and theory. It includes studies offered as general ethnographic analogies, as well as those that assume direct historic continuity. The paper will also discuss unexplored problem areas where ethnoarchaeology studies would be particularly useful. (32)

Arnold, Dean (see DeBoer, W. R.) (32)

Arnold, Dean (see van der Leeuw, S. E.) (32)

Arostegui, Carlos B. (Dumbarton Oaks) MARRIAGE, ALLIANCE, AND SUCCESSION IN PRECOLUMBIAN MIXTEC SOCIETY. This paper will present an analysis of the genealogical data contained in the Precolumbian Mixtec codices. It will examine the relationship between elite marriages and the establishment and preservation of interkingdom alliances. The role of marriages between close kinsmen as a mechanism for the prevention and/or resolution of stresses brought about by succession will also be investigated. (48)

Ashmore, Wendy (Pennsylvania) RESEARCH AT QUIRIGUA, GUATEMALA: THE SITE-PERIPHERY PROGRAM. The Quirigua Project of the University Museum (University of Pennsylvania) and the Instituto de Antropología e Historia (Guatemala) has now completed three seasons of field research at this Classic Maya site in eastern Guatemala. The Site-Periphery Program of the project was designed to complement the Site-Core Program by defining the temporal and functional range of occupation in the vicinity of the traditionally delimited "site" of Quirigua. In this work, the aim has been to test and develop several possible models for ancient roles filled by this Maya community and the paper presented here summarizes site-periphery fieldwork and analyses as of the end of the 1977 research season. (55)

Attebury, Anne (SMU) NEW EXCAVATIONS AT KHARGA OASIS: THE ATERIAN WORKSHOP (SITE E76-4). The recent excavation of an Aterian workshop at El-Kharga, Egypt, produced in situ material pertinent to both the general understanding of this area and the overall character and distribution of the Aterian in Egypt. In addition to a description of the workshop, this preliminary report considers the relationship of the site to other material known from this area, as described by Caton-Thompson (1952). Known Aterian occurrences from Bir Sahara/Bir Terfawi in the Western Desert provide additional comparative material. This material, while at least broadly comparable typologically, differs from the site at Kharga in terms of stratigraphic sequence. This discrepancy may suggest chronological and environmental diversity between the two areas. The implications of this possibility are presented and evaluated. (20)

Autry, William O., Jr. (Vanderbilt) HUMAN BURIALS FROM W.P.A. EXCAVATIONS AT MOUND BOTTOM, TENNESSEE (40 CH 8). Ninety-four burials, distributed over five cemetery areas at the large Mississippian site of Mound Bottom near Nashville, Tennessee, constitute the burial sample for this report. These burials were excavated between 1936 and 1940 by W.P.A. crews under the direction of C. H. Nash, Stuart Neitzel, and Georg Neuman. Burial data are summarized from existing W.P.A. field notes and maps in order to synthesize

mortuary practices. Comparisons are drawn with additional Mississippian centers and stone-box cemeteries from the Nashville basin. The small sample size and poor bone preservation limit interpretations, but mortuary practices indicate little, if any, differences in social status. (53)

Ayers, Harvard G. (Appalachian State) CHEMICAL CHARACTERIZATION OF NORTH AMERICAN CHERT SOURCES. Chemical analysis of cherts from six North American aboriginal quarry areas was performed. Analytical procedures and statistical treatment of the data are described. Multivariate analysis of the results indicate that the cherts from the different quarry areas could confidently be differentiated on the basis of three elements: Calcium; Aluminum; Iron. (14)

Baker, B. Lea (Ohio State) A TEST OF THE UTILITY OF AERIAL PHOTOGRAPHY IN STUDYING PREHISTORIC MAYA RURAL SETTLEMENT PATTERNS IN YUCATAN, MEXICO. The use of airplane-flown vertical photography and helicopter-flown oblique photography played an integral role in the recent study of prehistoric Maya rural or intercenter settlement patterns in a 158 square kilometer area in northwestern Yucatan, Mexico. This paper will examine the ways in which these methods of remote sensing were used and will evaluate their effectiveness in facilitating the recognition and location of architectural remains, as well as in determining characteristics and distribution of architectural remains in the Yucatecan environment. (31)

Baker, Charles M. (Georgia) PREHISTORIC LITHIC RESOURCE PROCUREMENT/UTILIZATION STRATEGIES: A GENERAL APPROACH TO STONE AGE ECONOMICS. Relationships between the technological and typological variability of lithic assemblages and the types of lithic resources that occur in particular archaeological areas are examined. The various possible states of raw material availability, abundance, ease of procurement, quality, and size are considered with respect to observable intra-assemblage variability in order to suggest potential indicators of different lithic resource procurement and utilization strategies. These suggested tentative relationships are evaluated in an interassemblage study based upon chipped stone collections from Mogollon-Mimbres sites in southwestern New Mexico. (3)

Ball, Joseph W. (San Diego State) THE CERAMICS OF CHINKULTIC, CHIAPAS, MEXICO: AN INTERIM REPORT. Analysis of archaeological ceramic collections from the highland Chiapas site of Chinkultic, Mexico, has permitted definition of a discontinuous three-phase sequence commencing during the Maya Protoclassic period and terminating during the Early Postclassic interval. A preliminary outline of this sequence is presented together with observations on external connections and probable origins for each of its recognizably distinct segments. (55)

Bandy, Philip A. (Texas Tech) REPORT AND TEST OF A NEW TECHNIQUE FOR MAPPING AND RECOVERY OF "EXPOSED" ARCHAEOLOGICAL SITES. "Exposed archaeology" contains valuable sociocultural information which all too frequently archaeologists have not been willing to recover. The main limit to recovery of these data has been the extreme expense of the present mapping techniques. Now a new mapping technique has been developed that will allow more expedient recovery of the "exposed" archaeology so common in the Texas and Southwest areas. The construction of the device and its operation is presented, including also a recent test in comparison with mapping by a transit and planetable/alidade. (29)

Barbour, Warren (SUNY-Buffalo) PREHISTORIC FINGERPRINT IMPRESSIONS: A METHOD FOR DETERMINING THE SEX OF THE MANUFACTURERS OF FIGURINES AT TEOTIHUACAN, MEXICO. Sexual differences in ridge width, mean, and variance of finger impressions have been observed in modern populations. These same differences can be observed and measured in fired clay. A method has been devised to recover and accurately measure impressions on fired clay figurines from Teotihuacan (150 B.C.-A.D. 750). With a large enough sample the sex of the manufacturer can be discovered by applying methods adapted from modern physical anthropology. The social importance of changes in political, economic, and religious organization as well as changes in residence patterns inside the ancient city are discussed. This study offers an unusual chance to relate biological differences to social change through the analysis of archaeological material. (34)

Barnes, Mark R. (NPS) THE ROLE OF THE OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION, The 1966 National Historic Preservation Act provided for the establishment of the National Register of Historic Places, the State Historic Preservation Officers, and a Grants-in-Aid program to conduct cultural resource surveys and acquire or develop these resources. The National Register is also in charge of reviewing determinations of eligibility, nominations of cultural properties to the Register, and working with federal agencies to insure compliance. The discussion will center on the workings of these branches of the Office of Archeology and Historic Preservation and how these can be of help to archaeologists when working with federal agencies or undertaking research. (18)

Bartel, Brad (San Diego State) BOW-WAVE DIFFUSION AND NEOLITHIC FIGURINE DISTRIBUTION IN THE MEDITERRANEAN. Multivariate and formal analyses are performed on a corpus of anthropomorphic figurines to determine rules explaining morphology and decoration. Probable dynamics of synchronic variation and diachronic change are also examined. (16)

Bayham, Frank E. (Arizona State) PLEISTOCENE MEGAFAUNA: TROPHIC ORGANIZATION AND POPULATION REGULATION. The influence of early man and climatic change upon the extinction of certain forms of Pleistocene fauna is an unsettled question. The ability to assess the actual impact of man in this scheme can only come in conjunction with a detailed awareness of the ecological relationships occurring among those animals present. Open range herbivores, specifically pronghorns, bison, horses, camels, and mammoths are examined with emphasis on their position in the trophic chain. Net primary productivity, population limiting factors, and life history strategies are explored and compared to estimate the differential effects of climatic change upon certain species. (5)

Bell, Robert E. (see Brown, J. A.) (25)

Benavides, Antonio (INAH) AIR PHOTO INTERPRETATION AT COBA. Coba is noted for its system of artificial causeways (Sacbeob). These causeways connect architectural complexes within the central area of that site and join Coba with other more distant communities. The causeway between Coba and Ixil is 20 kilometers long, while the Coba-Yaxuna sacbe is over 100 kilometers in length. The causeways are visible in standard aerial photographs. Enlargement of the photographs illustrates the size and extent of Coba and its causeways in an even more dramatic fashion. Results of air photo interpretation in Coba have direct implications for current discussion of Maya community form and social organization. (31)

Benchley, Elizabeth (Wisconsin-Milwaukee) PRESALVAGE INVESTIGATIONS AT CAHOKIA. An innovative program of presalvage investigations was pursued at the Cahokia site in East St. Louis, Illinois, during the summer of 1976, in cooperation with the Illinois Department of Conservation. Archaeological site feasibility studies conducted in conjunction with the planning stages for a new museum facility included aerial photographic interpretation, soil coring and phosphate analysis, and magnetometer surveys. This paper reports on the archaeological problems examined, the procedures, and the results of the aerial photo and phosphate efforts. (17)

Benfer, Alice N. (see Benfer, R. A.) (39)

Benfer, R. A. (Missouri-Columbia) ECOLOGIC AND DEMOGRAPHIC PATTERNS AT LA PALOMA, A PREAGRICULTURAL LOMAS VILLAGE. The preagricultural village, La Paloma (Site 613), occupied over 6,000 years ago in the arid Chilca Basin of central coastal Peru, is being investigated by a binational (Peruvian and United States), multidisciplinary team. This village, located just below the present day lomas vegetation, appears to have contained a large, sedentary population. Yet today, the land is not capable of sustaining any population except an occasional nomadic herder. The first season focus was the collection of skeletal material to form the demographic data base, and the collection of ecological and economic samples (floral, pollen, faunal, dessicated fecal samples, etc.). In addition, a new research design for handling large amounts of data and its feasibility will be discussed. (39)

Bennett, D. (see Brownman, D. L.) (49)

Benson, Elizabeth P. (Dumbarton Oaks) REPRESENTATIONS OF POTTERY IN MAYA ART. Representations of pottery are common on Maya polychrome pottery; they appear in more limited use in the Maya codices, and are scarcer still on sculpture. Several pottery shapes are depicted, and these are to some extent interchangeable. Pottery representations in the codices and some of the pottery on ceramics are containers for ritual materials—pulque, corn or glyphic elements. In the codices, they are either held by deities or placed with other ceremonial objects. The cylinder vases shown on the pottery frequently seem to be objects that are being revered; they appear on, or under, or beside thrones, or they may be shown in the process of being presented to the chief figure in the scene. These vases were probably themselves sacred objects, having to do with an earthly king's achieving a role in the court of the underworld. (38)

Bettinger, Robert L. (NYU) MULTIVARIATE STATISTICAL ANALYSIS OF REGIONAL SETTLEMENT-SUBSISTENCE SYSTEMS IN OWENS VALLEY, EASTERN CALIFORNIA. Multivariate statistical techniques were used to analyze a 5,500-year sequence of regional settlement-subsistence systems in Owens Valley, eastern California. Discriminant analysis, employed to develop a quantitative means for classifying sites in terms of major settlement categories, produced classification schemes identical to intuitive classifications between 83 and 92% of the time, depending on the kind of data used. Factor analysis was applied to isolate the principal sources of variation in the archaeological assemblages at the same sites. It yielded three factors, these being identified as a heavy duty manufacturing component, a light duty manufacturing, equipment repair, and daily maintenance component, and a base camp facilities component. (45)

Bird, Robert M. THE EVOLUTION AND INFLUENCES OF THE MAIZE OF THE INTERMEDIATE AREA. The Intermediate Area can be defined by archaeological, ethnological, linguistic, ecological, and, now, maize traits. Many maize races developed in northwest South America and Central America have had a very wide influence since possibly 3000 B.C.; the causes of this are unknown, but several speculations are possible. Certainly the maize of Guatemala is predominantly Intermediate; that of northwestern Mexico and the United States may be secondarily Intermediate. The earliest Peruvian maize is almost certainly from the Intermediate Area, as is the maize of Paraguay and eastern Bolivia. Even

the famous Blanco Imperial of the Cuzco area seems to be heavily influenced by maize of Cajamarca, an intermediate center of the first millennium A.D. The broad patterns described by anthropologists continue to aid in describing maize evolution, and the great amounts of information accumulated by maize specialists can help guide anthropological investigation. (22)

Black, Thomas K. III (Michigan) DISCRIMINANT FUNCTIONS ON THE DENTITION AS AN AID TO THE SEXUAL DIAGNOSIS OF HUMAN SKELETAL REMAINS. The sexual diagnosis of the skeletal remains of immature individuals is of great interest to the mortuary analyst. Unfortunately, no reliable means of sexing immature skeletons is presently available. This paper presents the results of investigations into the sexual dimorphism of the human dentition. Discriminant functions based on the tooth crown diameters of the deciduous and permanent teeth allow the remains of children to be sexed with a higher degree of reliability than was previously possible. (44)

Blake, Michael (British Columbia) ARCHAEOLOGICAL SURVEY OF THE DEMING PLAIN: INITIAL RESULTS. Archaeological survey during the summer of 1976 in the Deming Plain, southwestern New Mexico, is described. The aim of the survey was to expand on existing knowledge about the range of archaeological variation within the lower Mimbres drainage. Specifically, sites discovered represented several thousand years, including the Cochise tradition. For each time period we found differences in the number, size, structuring, location, and distribution of sites, in addition to a great deal of variation in artifact assemblages. There were, however, overall elements of continuity through time, with respect to certain aspects of these patterns. An approach for future Mimbres region survey, with an emphasis on intra- and intersite spatial analysis is offered. (1)

Bleed, Peter (Nebraska-Lincoln) THE DISCIPLINE THAT WASN'T: ARCHAEOLOGY IN PREMODERN JAPAN. During the Tokugawa period (1603-1868) developments in the direction of true archaeological research were independently made by Japanese Confucian historians, naturalists, and rock collectors. Advances and discoveries in these fields paralleled developments that ultimately gave rise to modern archaeology in the West. In Japan, however, intellectual and cultural values precluded the archaeological study of prehistory. This paper describes the characteristics of early Japanese archaeological achievements and the reasons for their sterility. (54)

Bolian, Charles (New Hampshire) THE ROLE OF THE UNIVERSITY ARCHAEOLOGIST. Bolian is currently helping to develop a comprehensive survey of the State of New Hampshire as a land planning tool for the preservation of archaeological sites and to insure compliance with federal project requirements. He is also involved in undertaking federally funded contracts for survey and excavation and research projects. Bolian will discuss the New Hampshire program in light of the advantages and disadvantages of having a consortium of professional archaeologists serve as advisors to a State Historic Preservation Officer, rather than having a State Archaeologist who acts as the coordinator of these endeavors, and the effects of this on developing a viable Department of Anthropology and conducting on-going research into the archaeology of the State of New Hampshire. (18)

Bonnichsen, Robson (Maine-Orono) BONE PRETREATMENT. Bone pretreatment refers to processing techniques used to alter the natural structure of antler and bone. Although ethnographic evidence documenting this procedure is rare, there is widespread inferential evidence in the archaeological record suggesting that it was commonly employed by prehistoric craftsmen. Experimental data outlining how several pretreatment techniques affect osseous materials is discussed. Subsequently bone and antler replicative experiments are reported with the goal of evaluating how bone pretreatment influences concepts in bone technology. (13)

Boone, Elizabeth Hill (Texas-Austin) THE LOST SIXTEENTH CENTURY SOURCE OF HERRERA'S TITLE PAGE VIGNETTES. The source for the title page vignettes in Antonio de Herrera's Historia General which depict deities and ceremonies is a now lost pictorial manuscript from central Mexico. Similarities between the vignettes and the Codex Magliabechiano also show that Herrera's prototype was a codex of the Magliabechiano group. Entries pertaining to this document can be identified in three Spanish bibliographies; these suggest that the manuscript was titled "Libro de Figuras" and indicate that it contained extensive ethnographic information on the Mexica. An eighteenth century copy of the manuscript has recently been found to exist in Madrid, which makes a partial and tentative description of the Libro de Figuras possible. (34)

Bradley, Lawrence E. (Kansas) ARTIFACT VARIABILITY IN THE EARLY UPPER PALEOLITHIC OF SOUTHERN CENTRAL EUROPE. Attributes of Early Upper Paleolithic tools, cores, and debitage from sites in Slovenia, Croatia, and Bosnia in Yugoslavia and from Lower Austria are utilized in an investigation of the variability between a group of sites that have been termed "Aurignacian." Although partial reporting of lithic materials from some of the sites suggests that the Aurignacian of the area is no more than a temporal designation, the multivariate analysis of more complete collections and classes of data other than the tools themselves suggests that this is not the case. (7)

Brambila, Rosa (INAH) CRONOLOGIA DEL OESTE DEL ESTADO DE QUERETARO, MEXICO—A TRAVES DEL SITIO ARQUEOLOGICO DE LA NEGRETA. Dentro de la frontera norte de Mesoamerica existen hiatus cronologicos que, hasta ahora, han impedido

tener una vision global de las fluctuaciones de este limite septentrional en el tiempo; ademas de sus relaciones con los Valles Centrales y sus conexiones con el Occidente de Mexico. A traves del analisis del material de excavacion encontrados en el Sitio de La Negreta, se obtuvo una secuencia interna que permitira aclarar, en cierto grado, la problematica que presenta esta region en su cronologia. Material que al compararse con el de sitios sin una secuencia bien establecida, tan comunes en la region, amplia el panorama de las diferentes etapas de ocupacion de zonas aledanas. (2)

Braun, David (Michigan) CERAMIC STYLE VARIABILITY DURING THE MIDDLE-LATE WOODLAND TRADITION IN WESTERN ILLINOIS. Characterizations of the Middle Woodland-early Late Woodland transition in western Illinois as a period of social fragmentation often cite as evidence a widespread decline in ceramic design complexity. This paper briefly reviews the assumptions under which social meaning can be assigned to observed changes in design complexity in tribal societies, and presents a modified version of the Deetz-Leone-Whallon approach for application to ceramic data from groups of proximate sites in the Illinois and Kaskaskia Valleys. Results of this application are found to contradict previous characterizations of the social changes but not the stylistic changes, that occurred during this period. (40)

Braun, David P. (see Luton, R. M.) (29)

Bridwell, Naidyne Brown (John Hersey H S) THE MANIFOLD BENEFITS OF HIGH SCHOOL FIELD ARCHAEOLOGY. The concept of field archaeology for the secondary school came to Hersey High five years ago. Today, financed by student fund-raising efforts, the crew is completely equipped with excavation tools and camping gear. A carefully selected team with experience in field methods gained through cooperation with a local college offers two to three weeks service to professional groups each summer. In return, the students receive a credit in Social Science. Six former participants are anthropology majors in college, but the most important result is the increased public awareness of archaeology in the school and community. (17)

Briggs, Alton (Texas State Historical Survey Committee) THE ROLE OF THE ARCHAEOLOGIST ON THE STATE HISTORIC PRESERVATION OFFICERS STAFF. As a staff archaeologist with the Texas State Historic Preservation Office, Briggs is intimately acquainted with the needs of federal agencies, research archaeologists, and the requirement of state and federal preservation legislation. The accomplishment of the preservation of large tracts of archaeologically rich resources are the end product of careful land planning, working with federal agencies, developing legislation, and utilizing the National Register of Historic Places and the Grants Division as a means of maintaining these resources for future research purposes. Briggs will discuss and review the Texas record in archaeological site preservation. (18)

Briuer, Frederick L. (UCLA) 9,000 YEARS OF CULTURAL AND NONCULTURAL DEPOSITION PROCESSES IN CAVES AND ROCK SHELTERS OF CHEVELON CANYON, ARIZONA. A report on the comparative analysis of plant and animal remains recovered from both cultural and noncultural sites with evidence of human occupation from the post-Pleistocene to Pueblo III times. (51)

Bronitsky, Gordon (Rutgers) MASS PRODUCTION AND COST REDUCTION. The late prehistoric northern Rio Grande region of New Mexico was characterized by an increase in population density and localization, and employment of measures of agricultural intensification. During this period, groups attempted to maximize the number and diversity of energy inputs into local systems. One concomitant of this increased interaction was a rise in standardization resulting from mass production techniques. This standardization is measured in terms of physical dimensions and the diversity of stylistic attributes, artifacts, and materials of lithic assemblages from three sites. Results indicate differential specialization by site in craft production and probable mass production of lithic cores during this period. (41)

Brose, David S. (Case Western Reserve) FORT WALTON SETTLEMENT PATTERNS. Fort Walton first appears at about A.D. 1050 as a partial socio-ceremonial pattern and stylistic shift adopted by late Weeden Island populations. Little change in settlement-subsistence is apparent. The late Fort Walton populations display a hierarchically organized, intensive agricultural Mississippian polity with the introduction of Southern Cult socio-ceremonial stratification at one of the large multi-mound temple towns in the Tallahassee Red Hills. In the Apalachicola River Valley, late Fort Walton displays a less tightly integrated series of uniformly spaced and paired, moderate-size, single mound riverine ceremonial towns, and a number of smaller campsites along rivers and in interfluvial locations. Along the northwest Gulf Coast a few widely spaced and isolated single mound ceremonial sites and large, nearly egalitarian cemeteries serve a low density population scattered in small mixed economy seasonal sites along the coastal-interior ecotone. These diverse late Fort Walton settlement-subsistence patterns are reflected in early historic reports of the region. (25)

Brownman, David L. (Washington) ENTREPRENEURS AND TIWANAKU ECONOMIC SPHERES OF INFLUENCE. Caravan trade as an economic specialization important to the maintenance of the urban center of Tiwanaku is discussed with special reference to the organization of this trade, the commodities involved, and the resulting influences on cultures not under the political hegemony of Tiwanaku. Certain classes of commodities,

such as hallucinogens and pharmaceuticals, stimulated entrepreneurial activity beyond their relative economic importance, and it is this activity which in part gives Tiwanaku such a different configuration from its sister imperial city of Wari in Peru. (49)

Brown, James A. (Northwestern) CADDOAN SETTLEMENT PATTERNS IN THE ARKANSAS RIVER DRAINAGE. Caddoan settlement patterns in the Arkansas River drainage record a Mississippian settlement organization sustained by the productivity of bottomland resources and corn agriculture in a transition between the prairie and forest at the western border of the southeast. The location of base camp sites on the western front of this region appears to be governed by the distribution of southeastern bottomland forest of relatively high productivity. The size and complexity of sites range from medium-sized mound centers to small villages, farmsteads, and special use sites. The structure of settlement patterning conforms to Mississippian systems found to the east although the scale of settlement hierarchy is reduced compared to systems in the Mississippi Valley. (25)

Brown, K. M. (Texas Archeological Survey) MIDDLE ARCHAIC CAMPS AT THREE MILE DRAW. Hearth of firecracked limestone in linear clusters flanking major arroyos (or in some cases, the escarpment separating recent floodplain remnants from the first terrace) are the earliest (Middle Archaic). There is substantial evidence of occupation in the mesquite/creosote scrubland habitat of the valley floors in the rugged canyonlands of southwestern Terrell County. Within major clusters, hearths tend to occur single or in multiples of two. Recent research has included mapping (including controls for differential exposure by sheetwashing). (35)

Bruhns, Karen Olsen (San Francisco State) ARCHAEOLOGICAL INVESTIGATIONS AT CIHUATAN, EL SALVADOR. Current archaeological investigations at Cihuatán, a supposedly single component Postclassic ceremonial center in eastern El Salvador are revealing earlier periods of occupation, of a substantial nature, at the site. In addition, an apparently different sort of settlement pattern than that usually assumed is evident. These new data indicate that revisions in the interpretation of the Cuscatlán border area and the entire Pipil question are in order. (28)

Bryant, Vaughn M., Jr. (Texas A&M) PALYNOLOGICAL RECORDS FROM HINDS CAVE. Fossil pollen recovered from soil deposits in Hinds Cave located in the Lower Pecos area of southwest Texas are used to infer aspects concerning the paleoenvironment and prehistoric cultures in that region. Pollen records for Hinds Cave span an 8,000-year period and provide data which can be correlated with other pollen records from nearby locales such as the Devil's Mouth Site and Bonfire Shelter. In addition, the recovery of certain types of economic pollen in the cultural deposits of Hinds Cave suggests the utilization of native plants as dietary foods. (35)

Burger, Richard (California-Berkeley) THE SOCIO-ECONOMIC BASIS OF CHAVIN. An archaeological study of habitation sites in the vicinity of Chavín de Huantar and at site 97-76 yields a three-phase occupation sequence for the late IP-early EH: a newly discovered Unabariu phase, and two later phases corresponding to Ofrendas and Rocas. Indications are that a large town surrounded the Chavín temples during Phase D. This large settlement was located on the west side of the Rio Mosna while small contemporaneous villages were occupied at the upper limits of the agricultural zone. The Unabariu ceramics have intriguing relationships with ceramic styles from the North and Central Sierra and the Central Coast, which bear directly on a tentative hypothesis for the origin of Chavín. (39)

Burgess, Tony L. (Texas Tech) A RECONSTRUCTION OF THE VEGETATION OF THE BRANTLEY RESERVOIR AREA PRIOR TO ANGLO-AMERICAN SETTLEMENT. The major plant associations currently present in the area and their relationship to topography and soil are described. Historical sources indicate that Anglo-American settlement induced vegetational changes resulting from the introduction of exotic plant species and increased grazing, erosion, and water utilization. The probable effects these changes had on the distribution and relative abundance of dominant species are derived from historical data and comparisons with extant stands. In general, species characteristic of the more xeric desert shrub communities appear to have increased, and the grassland species have become more restricted in occurrence. A reconstruction of the predominant plant communities of the area before the introduction of domestic cattle about 1870 is presented. (27)

Butzer, Karl W. (Chicago) CHANGING HOLOCENE ENVIRONMENTS AT THE KOSTER SITE: THE GEOMORPHOLOGICAL PERSPECTIVE. Koster is situated in a minor tributary valley of the Illinois River. Illinoian and Wisconsinan deposits preserved under and adjacent to the site include proglacial silts, outwash terraces ("sand ridges"), till, cryoclastic slope scree, multiple loesses, dunes, and several paleosols. Accumulation of reworked loess in an over-deepened valley began at Koster shortly after 10,000 B.P., and continued through Holocene times, with major sedimentary breaks. The floodplain began to stabilize ca. 5000 B.P., after rapid aggradation, but remained a dynamic environment that developed its present patterns after 2500 B.P. Hillside vegetation was considerably more xeric A.D. 750-1000, 2100-1900 B.P., and ca. 9700-500 B.P., with hillside woodland reduced to hill prairie or parkland ca. 8500-7700 B.P. These dramatic Holocene environmental changes enhance understanding of the Midwestern biomes, and show that interpretative archaeological models for cultural adaptations through time must consider the environment as a critical variable, rather than as a constant. (5)

Byrd, Kathleen Mary (Louisiana State) ANIMAL UTILIZATION AND EXPLOITATION PATTERNS IN PREHISTORIC SOUTHWEST ECUADOR. The purpose of this study is to determine certain subsistence practices and related human behavioral patterns for prehistoric inhabitants of southwest Ecuador. This is accomplished by analyzing the vertebrate, faunal remains. A total of 15 samples is considered, including three pre-Valdivia, eight Valdivia, and four post-Valdivia sites (ca. 5000 B.C.-A.D. 1400). Based on these analyses, questions concerning protein scarcity and protein acquisition, changes in protein exploitation and subsistence orientation, hunting and fishing methods, and human behavioral patterns for the various groups are considered. (30)

Cameron, Marguerita (see Sheldon, E.) (53)

Cantwell, A. M. (Rutgers-Newark) A FUNCTIONAL ANALYSIS OF TWO EARLY HAVANA TRADITION SITES. This paper is an initial exploration of Havana Tradition settlement systems. Intersite variability between two sequent sites in the central Illinois Valley, Dickson Camp and Pond, is examined. The assemblages are classified and then compared according to functional categories, with special attention being paid to the subsequent functions of reworked artifacts. A consistent pattern of variation, evident through a series of analyses, suggests that Dickson Camp was a bluff-crest, multiple activity, late summer/early fall, base camp with hide working a dominant activity, while Pond was a bluff-base, highly specialized, work camp with lightweight cutting tasks dominant. (17)

Carlisle, Ronald C. (see Andrews, R. L.) (20)

Chandler, Susan M. (Colorado-Boulder) THE DISCRIMINATION OF TECHNOLOGICAL BEHAVIOR: AN EXPERIMENT IN LITHIC REPLICATION. A method of analysis is developed which attempts to identify sources of technological variability in lithic materials by experimental replication and empirical multivariate analysis. The paper reviews the research design and substantive results of an experiment involving the replication of Preclassic Mesoamerican obsidian blades. Discriminating morphological variables between percussion and pressure blades were identified through the use of discriminant function analysis and principal components analysis. The theoretical and methodological value of the analytic method, or method of controlled experiment, in lithic replication study is emphasized. (14)

Chapman, Jefferson (Tennessee) EARLY ARCHAIC PERIOD RESEARCH IN THE LOWER LITTLE TENNESSEE RIVER VALLEY: RETROSPECT 1977. Archaeological investigations over the past four years have located and tested over 20 deeply buried, stratified Early Archaic period sites situated on the first terraces of the Little Tennessee River in eastern Tennessee. Thousands of artifacts, features, abundant paleobotanical remains, radiocarbon assays, and archaeomagnetic determinations have provided considerable insight into the Kirk and bifurcate traditions. With the current inundation of the river valley and cessation of fieldwork, an overview and summary of the results to date seem appropriate. (53)

Chartkoff, Joseph L. (Michigan State) TIME AND SETTLEMENT AT PETRIOLO DURING THE WURM. Survey, surface collection, and excavation data from the valley of the Farma, south of Siena, Italy, provide evidence for a series of Mousterian and Upper Paleolithic occupations during the last glaciation. The data suggest that Upper Paleolithic settlers were like their Mousterian predecessors in utilizing a series of stream terraces for occupation, but that Upper Paleolithic settlement was both much denser and showed greater diversity of terrain choice. The sites, 80-90 km inland but only 150-250 m above sea level, do not correspond to Barker's model of Mousterian coastal occupation and Upper Paleolithic transhumant settlement of the coast and highlands. Radmill's recently published compendium of prehistoric Italian sites provides grounds for suggesting that, during the Wurm, interior Italy was exploited by both Mousterians and Upper Paleolithic hunter-gatherers primarily during interstadial phases. During stadial maxima, occupation would be concentrated along the present coast and on what are now submerged coastal plains. Data relating to the validity of the hypothesis are considered. (7)

Chomko, Stephen A. (Missouri-Columbia) NEW EVIDENCE FOR CULTIGENS IN LATE ARCHAIC ARCHAEOLOGICAL SITES. Two cultigens, squash and sunflower, have recently been recovered from three Late Archaic sites: Phillips Spring (southwestern Missouri); and the Carlton Annis and Bowles Sites (western Kentucky). The new data add supportive evidence to validate previously reported cultivars in preceramic contexts from sites in the eastern United States. At present it appears that squash (*Cucurbita pepo*) was introduced into eastern North America by 4000 B.P. while the earliest possible date on sunflower (*Helianthus annuus*) as a native domesticate is at least 500 years later. Although the route of introduction of tropical cultigens remains unclear, the presence of squash indicates that the development of an eastern horticultural complex was influenced by early developments in Mesoamerica. (6)

Christenson, Andrew L. (UCLA) EFFICIENCY, MAXIMIZATION, AND POPULATION PRESSURE: SOME NEW LIGHT ON OLD CONCEPTS. Subsistence efficiency is defined as the ratio of calories consumed (output) to calories expended in subsistence effort (input). For any given population density, subsistence efficiency is maximized by minimizing labor input. A marginal cost model is presented showing that for groups exploiting natural plant and animal communities, subsistence effort must increase and subsistence diversity must

increase as population density increases. Increasing subsistence diversity is an indication of declining subsistence efficiency ("population pressure") rather than increasing subsistence efficiency as usually assumed. Subsistence efficiency must be an important variable in any model of human subsistence behavior. (37)

Cinquino, Michael (see Weigand, P. C.) (34)

Ciolek-Torrello, Richard (Arizona) RECONSTRUCTING PREHISTORIC ACTIVITIES AT GRASSHOPPER PUEBLO. Results of ongoing investigations of activity organization at a large fourteenth century community in east-central Arizona are presented. The archaeological context of Grasshopper contains an abundance of artifacts in direct association with occupational surfaces. This situation provides a unique opportunity for the use of spatial and quantitative analytic techniques in the reconstruction of activities. These investigations suggest an activity organization at Grasshopper that departs from the model of Puebloan domestic organization employed in archaeological literature. In addition, evidence from superimposed floors suggests that the use of activity spaces changed in line with the growth of the pueblo. (51)

Claassen, Cheryl (Harvard) ESTIMATING OCCUPATION SPAN FROM ARTIFACTS: A TRIAL RUN AT STARO SELO, YUGOSLAVIA. At present there are few measures of site occupation span. Both the quantity of total artifacts in archaeological context and the quantities of types of artifacts in archaeological context can provide an estimation of the length of occupation. Several formulas are employed and the variables uselife, systemic number, and frequency of discard are discussed and quantified with relation to several archaeological sites: Millie's Camp, Badger House, and Staro Selo, Yugoslavia. The ceramic, quern, and flint tools are utilized in deriving the occupancy span of House 1 at Staro Selo. (16)

Clark, J. Desmond (California-Berkeley) ASPECTS AND PROSPECTS OF ETHNO-ARCHAEOLOGICAL RESEARCH IN AFRICA. A general review of the recent (postwar) ethnoarchaeological research in Africa is discussed here, including studies of settled villagers, herding/nomadic groups, and hunting and gathering peoples. Prospects for future cooperation between archaeologists and ethnographers is assessed. (24)

Clark, N. (see Brownman, D. L.) (49)

Cliff, Maynard B. (SMU) LATE PRECLASSIC BURIAL PATTERNING AT THE SITE OF CERRO MAYA, NORTHERN BELIZE: PRELIMINARY RESULTS. Burial data from the late Preclassic period in the Maya Lowlands have usually been either ignored, or assumed to follow Early Classic patterns for purposes of comparative diachronic analysis. This is primarily because of the small sample sizes that have been recovered from Late Preclassic contexts in the past. The site of Cerro Maya (or Cerros) in the Corozal District of northern Belize is at present unique in having yielded a relatively large sample of Late Preclassic Maya burials. The burials occur in distinct and easily recognizable clusters within a primary midden deposit. This deposit underlies the main plaza of the ceremonial precinct, and contains Chicanel ceramics and plaster floors. Preliminary analysis of these data seems to indicate that the burials were deposited throughout the Late Preclassic period, in association with "household clusters," occurring in a nucleated pattern surrounding the early ceremonial precinct. Indications of change through time in terms of body treatment and mortuary furniture also seem to reveal a pattern of increasing status differentiation and increasingly standardized ceremonialism in regard to funerary practices throughout the Late Preclassic period. (47)

Cobean, Robert H. (Harvard) THE CHRONOLOGY OF THE TULA REGION. Our chronological framework for the Tula region is provisional and largely based on ceramic stratigraphy and settlement pattern data. Only three reliable radiocarbon dates (all from Tula's Early Postclassic) are available for the entire region, but other C-14 and archaeomagnetic dates will be available soon. Culturally, the region appears to have had close ties with the Basin of Mexico throughout prehistory. The earliest occupations are Late Formative. Terminal Formative occupations appear to have ceramic complexes similar to complexes at Teotihuacan. In the Early Classic or slightly later, some sites in the southern periphery were settled by people from Oaxaca or with strong Oaxacan ties who made pottery much like that of Teotihuacan's Oaxaca barrio. Throughout the Early Classic, there appears to have been continuous occupation, but the ceramic complexes differ more from the coeval complexes in the Basin than previously. However, many "pure Teotihuacan" pottery types are associated with local Classic types, and at least one large Classic site appears to have functioned as a provincial center for Teotihuacan. In the Tula region, there may have been a massive depopulation after Teotihuacan's collapse. During Tula's apogee as a major Early Postclassic city, orange pottery is the most common and diagnostic type, resembling the Aztec. Extensive depopulation may have occurred during Aztec III times after Tula's fall. Aztec ceramic complexes from Aztec III onward are essentially identical to those of the Basin. (2)

Collins, Alana Cordy (San Diego Mesa) HALLUCINOGENS AND SYMBOLIC INTEGRATION IN THE CHAVIN CIVILIZATION. Hallucinogenic substances have played a pervasive role in the religious orientation of many New World civilizations, including those of ancient Peru. The role of hallucinogenic substances in the religion of the civilization of Chavin, the first major civilization of Peru, is discussed. The uses of iconography, comparative

iconography of various media, and the limitations of iconographic analysis and long range backward projection of ethnographic analogy are discussed within the specific context of Chavin and its symbolic integration. (39)

Cooke, Richard G. (Smithsonian Tropical Research Institute) THE EXPLOITATION OF ANIMAL RESOURCES ALONG THE PACIFIC LITTORAL OF CENTRAL PANAMA. Though traditional faunal analysis attempts to reconstruct, by extrapolation and comparison, components of biotic communities that were exploited archaeologically, samples are often biased toward one group of organisms (frequently mammals or fish). This bias is particularly prevalent in the tropics and is due to dietary strategies of the studied groups, factors of conservation, and recovery techniques employed. From 1971 to 1975, a large faunal sample was recovered from the agricultural village of Sitio Sierra, Coclé, Panama. Though the mammalian sample lacks species, it could be due either to preferential hunting or environmental modification. Reconstruction of the total contiguous or exploited community is simplified by analysis of avian, reptilian, and anuran remains. The Sitio Sierra sample is compared with those from neighboring sites and an attempt is made to document the history of man's exploitation of animal resources along the Pacific littoral of central Panama and his effects on the communities that provided them. (28)

Cordell, Linda S. (New Mexico) LATE ANASAZI HUNTING: INFERENCES FROM THE TIJERAS PUEBLO FAUNA. Analysis of faunal material from trash deposits from Tijeras Pueblo, a fourteenth century Anasazi site in central New Mexico, indicates unexpected patterning, given the site's cultural and environmental context. Relative proportions of hunted species represented indicate considerable energy expenditure for a community supported by domestic crops. Consideration of butchering marks, rib fragment size, underrepresented elements, and ages of animals present indicates heavy year-round utilization of game. These data, when compared with ethnographic game-processing strategies, local climate, and nutritional information, permit tentative isolation of specific stress factors operating to encourage hunting that are amenable to further testing utilizing independently derived paleoclimatic reconstructions. Detailed examination of faunal remains from late Anasazi sites has rarely been undertaken. Paleoclimatic reconstructions based on palynology and/or tree-ring studies are often difficult to interpret, though critical to questions involving site abandonment. Therefore, using faunal analysis to generate hypotheses about specific conditions under which certain hunting and processing strategies would be employed by horticultural groups is productive. (41)

Crader, Dinah (see Gifford, D.) (24)

Crane, Richard (Tulane) CEREMONIAL CENTERS AND CLASSIC PERIOD ARCHAEOLOGY OF CENTRAL EL SALVADOR. For the past three years a salvage program in the Middle Lempa Valley of central El Salvador has been conducted by the National Museum of El Salvador, resulting in excavations at more than ten sites dating to Preclassic, Classic, and Postclassic periods. Details of the recent findings will be presented, including the architecture and settlement plan of several ceremonial centers, one of which is an annular complex of platforms surrounding two central structures. Preliminary data on material culture in Classic period contexts to be discussed show vigorous local development within a broader sphere of regional interaction. A postulated occupational hiatus for the Early Classic will be considered in light of reconnaissance and excavations. (36)

Crawford, Gary W. (North Carolina-Chapel Hill) STUDYING JOMON PALEOETHNOBOTANY. An examination of the paleoethnobotany of northeastern Japan was undertaken in order to resolve and derive questions related to Jomon and post-Jomon adaptations. Methodological problems of intersite and intrasite comparisons of flotation samples are discussed. Samples from the Early Jomon Hamanasuno site show patterns of plant remains preservation and recovery that may have general significance for flotation studies. In addition, preliminary data show that weed distributions within Japan and eastern Asia were probably influenced by prehistoric human activity, and that the "primary forest efficiency" of the Jomon is questionable. Examination of such subsistence data will contribute to our understanding of the maintenance of socio-cultural systems over long periods of time. (54)

Crawford, Gary W. (see Chomko, S. A.) (6)

Crespo, Ana Maria (see Cobean, R. H.) (2)

Cridlebaugh, Patricia A. (Tennessee) PENITENTIARY BRANCH: PROBLEMS OF EXCAVATION AND ANALYSIS OF AN ARCHAIC SHELL MIDDEN. The excavation of this Tennessee Middle to Late Archaic shell midden represents one of the few such sites excavated there and has yielded data generally lacking for this time period and site type. Absence of certain artifacts characteristically associated with shell middens of this period in the Southeast and intense shell concentrations at the Penitentiary Branch site caused problems in the excavation and analysis of material. However, recovery of extensive faunal and paleobotanical material, human skeletal material, and a lithic and bone tool assemblage provides useful data for comparison with other Southeastern shell middens. (53)

Cring, Forrest D. (Florida State) ANALYSIS OF FAUNAL MATERIALS FROM CINNAMON BAY. Analysis of faunal materials recovered from excavations at Cinnamon Bay,

Virgin Islands National Park, indicates an aboriginal dependence on marine resources. This includes shellfish (queen conch, clams, and crab) and fish (wrasse and rays). The small quantity of deepwater fish remains suggests inshore fishing and trapping as primary hunting techniques. Mammal remains indicate that rodents were present in significant quantities in the diet. Statistical analysis techniques were employed to investigate temporal continuity and discontinuity in faunal remains. (12)

Crumley, Carole L. (Missouri-Columbia) SPACE-TIME DIALECTICS: A SHORT HISTORY AND PROSPECTUS OF LOCATIONAL ANALYSIS IN ARCHAEOLOGY. In the past five years, what is termed regional or locational analysis has become an approach frequently chosen by archaeologists. The history of the utilization in other disciplines (biology, geography, economics) is much longer, although methodological rather than theoretical considerations have dominated that literature. Close examination of both methodological and theoretical aspects of locational analysis and its application to archaeological data adds an important dimension to the study: The conscious introduction of the temporal variable offers further insight into both culture change and the human use of space. (52)

Culbert, T. Patrick (see Dahlin, B.) (23)

Dahlin, Bruce (Catholic) THE PROPOSED COMPREHENSIVE MAYA LOWLAND MAPPING PROJECT. The feasibility of the funding of a side-looking radar mapping project in the Petén is currently being discussed with representatives of various federal agencies and contractors. The plan features a locational site survey of three sample areas each of 1,000 square kilometers. The areas are centered on El Mirador, Tikal/Uaxactún, and the extreme northeastern Petén. The discussion will focus on problems of cost, study time required, and diplomatic concerns such as airspace permissions. (23)

Davidson, Thomas E. (see Neely, J. A.) (41)

Davis, E. Mott (Texas-Austin) A REVIEW OF RADIOCARBON DATING IN THE CADDOAN ARCHAEOLOGICAL AREA. A critical compilation of nearly 300 radiocarbon dates from Caddoan sites by Patterson (an archaeologist) is subjected to dendrochronological and other corrections by Valastro and Varela (Associate Director and Technician, Radiocarbon Laboratory) and the results are appraised by Davis (archaeologist and Director, Radiocarbon Laboratory) and Valastro. In addition to examining the effect of the corrections on Caddoan chronology, we discuss matters of sample selection and submission, and the correction, reporting, and utilization of radiocarbon measurements in archaeology. Much archaeological use of radiocarbon dating is still uncritical; it is time such usage came of age. (19)

Deagan, Kathleen A. (Florida State) A SUBSURFACE SURVEY OF DOWNTOWN ST. AUGUSTINE, FLORIDA. A systematic subsurface sampling strategy using a mechanical soil auger was applied in downtown St. Augustine, Florida, in an attempt to learn the boundaries of the sixteenth and seventeenth century Spanish settlements. Although these settlements were known to have been within the confines of the known eighteenth-century walled city, the exact locations of the earlier settlements were unknown. This report describes the results of the survey, which strongly suggested boundaries through time, as well as the use of a mechanical auger in an urban area. (42)

Dean, Donna (Texas A&M) MOUND BOTTOM: AN ENVIRONMENTAL ANALYSIS. Mound Bottom, located on an alluvial terrace of the Harpeth River, is in the transitional zone between the Highland rim and the Nashville basin. The Harpeth River Valley is in the Western Mesophytic Forest region which is interpreted as a transition between the Mixed Mesophytic Forest Region to the east and the Oak-Hickory Forest region to the west. Transitional zones or ecotones are rich in biotic resources, many of which were important food sources for the indigenous populations. (53)

Dean, Jeffrey S. (Arizona) AN EVALUATION OF THE SARG EFFORT. A number of problems that arose in the course of the SARG effort to do cooperative research are identified. The most important of these concerns disagreement that developed concerning the specific problem addressed by the SARG research design and by SARG members as they applied that design in specific areas. A second major problem concerns the extent to which "comparable" data result from the use of "standardized" variables. Difficulties involving the kinds of data collected, data collection techniques, and analytical techniques are also considered. The implications of these problems for cooperative research efforts and for any effort to synthesize the results of different research projects done by different investigators are discussed. (10)

DeBoer, Warren R. (Queens, CUNY) THE WOMB AND THE TOMB: CONTRASTING MODELS FOR UNDERSTANDING AMAZON PREHISTORY. The Amazon Basin has long been an enigma and a source of speculation in which relatively few data are used to promote extreme and vigorously defended paradigms. On the one hand, the ethnographic record and selective appraisal of the agricultural potential and protein supply have been used to portray Amazonia as a cul-de-sac, always peripheral to mainstreams of cultural development in Andean South America. Recent archaeological work and a more differentiated view of the area's environmental potential suggest a completely different picture in which Amazonia figures prominently in agricultural origins and the rise of long-distance trade networks and

stratified societies. These contrasting models are evaluated in terms of ethnographic, linguistic, archaeological, and historical evidence for Panoan speakers of the Upper Amazon. Both are found wanting, and a revisionist model is offered. (24)

Dering, J. Phil (Texas A&M) PLANT REMAINS FROM HINDS CAVE. The excavation of Hinds Cave, a southwest Texas rockshelter, has recently yielded an abundance of well-preserved plant macrofossils. This paper will present results from an analysis of the plant materials recovered from early and late Archaic burned rock middens within the shelter. These data are compared to information drawn from available ethnographic literature and studies of prehistoric diets in order to describe aboriginal plant utilization and its relation to burned rock middens in southwest Texas. (35)

Deutchman, Haree L. (SIU-Carbondale) THE USE OF DISCRIMINANT ANALYSIS TO INTERPRET CERAMIC DESIGN ELEMENT VARIABILITY. In an effort to examine intraphase variability of ceramic assemblages from Toreva phase (A.D. 1075-1150) sites on Black Mesa, Arizona, Tusayan White ware, from a surface survey, was analyzed. Painted decoration of the pottery was described by means of an hierarchical system of design attributes. One question posed was the extent of variability between sites in a restricted region during a short occupation span. Linear discriminant analysis was applied to ceramic assemblages from 17 sites. This multivariate statistical technique made it possible to describe sites on the basis of similarity of ceramic assemblages. The potential of discriminant analysis for archaeological problems has not been sufficiently recognized. This statistical method is an easily implemented, easily interpreted, and robust method, as well as a useful descriptive tool for development of identification keys for artifact assemblages. Results of this study substantiate the capacity of discriminant analysis to highlight variability and interassemblage differences. (40)

Diaz, Clara L. (see Cobean, R. H.) (2)

Dickens, Roy S., Jr. (Georgia State) MISSISSIPPIAN SETTLEMENT PATTERNS IN THE APPALACHIAN SUMMIT AREA. This paper will summarize the existing data on settlement patterns for the Pisgah, Qualla, and other contemporary Mississippian phases in the Appalachian Summit area. I will attempt to delineate the distinctive features of these patterns as compared with Mississippian patterns in neighboring areas of the Southeast. Even though the data are limited, I will also develop some interpretations of the systemic relationships of the Appalachian Summit settlement patterns to the societies and their physical environments, and trace these relationships from the Early Mississippian period to the historic period. (25)

Dickson, D. Bruce (see McEwan, G. F.) (30)

Diehl, Richard A. (Missouri-Columbia) AFTER THE OLMECS—THE POST-FORMATIVE OCCUPATION AT SAN LORENZO TENOCHTITLAN. This paper examines the material culture, architecture, and settlement patterns of the Villa Alta phase (Late Classic-Early Postclassic) at several sites in the Rio Chiquito area of southern Veracruz, Mexico. It will attempt to explain why the area became a focus of dense settlement after being virtually abandoned for almost 1,000 years and why it was once again abandoned after a brief florescence. Information from other sites in southern Veracruz and Tabasco will be integrated into a culture historical synthesis of the area for the Classic and Postclassic periods. (34)

Diehl, Richard A. (see Stroh, E. G., Jr.) (34)

Dinnel, Katherine (Florida State) HISTORIC CERAMICS AND HUMAN REMAINS FROM THE VIRGIN ISLANDS NATIONAL PARK. Artifactual remains of the Danish plantation system include a wide variety of glass and ceramic types. A high percentage of the glass types are from wine and beer bottles. The historic ceramics include imported porcelains, earthenwares, African-type ceramics made by slaves, and some Spanish ceramics. The human remains found were predominantly burials eroding out of the beach area. Their location and physical anthropology suggest that they were slave burials. (12)

Dodge, William A. (Zuni Archaeological Enterprise) THE ZUNI ARCHAEOLOGICAL ENTERPRISE: A NEW CONCEPT IN CONSERVATION ARCHAEOLOGY. The Zuni Archaeological Enterprise is a tribal agency organized to give the Zuni Indians a greater role in the preservation and protection of their cultural heritage. Many advantages are gained from having an on-reservation group engaged in contract archaeology. Development projects needing archaeological clearance investigations are facilitated, the economic base of the tribe is expanded, and the long range management planning for cultural resources is promoted. This history of the enterprise, its organization and accomplishments, and future goals for the program are discussed. (43)

Dodge, William A. (see Ferguson, T. J.) (41)

Donahue, J. (see Adovasio, J. M.) (6)

Donahue, Randolph E. (Michigan State) OPTICAL SCANNING FOR ARTIFACT ATTRIBUTE RECORDING AT PETRIOLLO II. This paper describes a new approach to artifact

attribute recording that has significant implications for analysis method and theory. It is being tried for the first time with artifacts from the 1976 season at Petriolo II. The method utilizes optical scanning of specially printed checklists, a little like the format of a machine-graded multiple-choice test. A Hewlett-Packard optical scanner treats the checklist as a matrix and plots checked boxes. The Hewlett-Packard 2500 computer transforms the recorded data into language suitable for a CDC 6500 or other large computer and loads it on tape. The recorded attributes can then be analyzed as desired. The method completely avoids keypunching and therefore eliminates the largest source of analytical error. With collections of more than 2,000 artifacts, the cost of optical scanning is lower than for keypunching, and cost differences increase with collection size. Most important, the card format for checklists allows for selection of more than one attribute within a class for an artifact, while existing systems allow for only one choice per class. This approach allows for much more realistic measurements of attribute occurrences on artifacts. (7)

Donaldson, Bruce R. (SUNY-Binghamton) LESSONS FROM THE WHITE MOUNTAIN PLANNING UNIT: A SMALL-SAMPLE SURVEY DESIGN FOR LARGE AREAS. Multidisciplinary evaluation of large-tract planning units on U.S. Forest Service land usually involves the archaeologist in the assessment of the kinds, density, and distribution of cultural resources. Since federal planning decisions, which usually focus on issues concerning noncultural resources, must be made in light of possible impacts on the prehistoric record, the archaeologist (usually operating under several constraints) must provide valid input to the decision-making process. A small-sample probabilistic survey is therefore required. This paper presents an hierarchical, multistage sampling design that is suitable for planning unit purposes and that is theoretically sound and methodologically efficient; a method for rapid evaluation of preliminary stage results is included. (50)

Dort, Wakefield, Jr. (Kansas) EARLY MAN AT OWL CAVE: GEOLOGY AND ARCHAEOLOGY OF THE WASDEN SITE, EASTERN SNAKE RIVER PLAIN, IDAHO. A growing perspective on the paleoenvironment and cultural history of the Snake River plain in southern Idaho, and, by extension, its reflection of regional and continental events of the late Pleistocene-Holocene period has been the orientation of archaeological and geological research at Owl Cave (10 Bv 30), the Wasden site, in southeastern Idaho. The special depositional history of the large lava rockshelter has yielded a well-dated sequence of occupations accompanied by faunal assemblages and sedimentary features, beginning with initial use of the rockshelter by hunters of bison and mammoth utilizing fluted points and bone tools ca. 12,500 B.P. Geologically, excavation in Owl Cave, one of three collapsed lava tubes, exposed 5 m of laminated silts believed introduced by wind, but distributed by water, mainly snowmelt. Bedding is interrupted by structureless wedges up to 50 cm long, and general horizontality is deformed by interwedge contortions from wedge growth. The wedges, descending from 8-10 distinct levels, indicate repeated climatic cyclicity through 6,000 years of late glacial to Altithermal time, a record apparently echoed by faunal variation. During filling, a ramp of early roof-fall permitted access by Folsom to recent man with elephant and bison remains. Ramp excavations in nearby Coyote Cave revealed multiple paleosols. (45)

Douthit, Mary Lee (see Purrington, B. L.) (5)

Downer, Alan S., Jr. (Missouri-Columbia) CENTRAL PLACE MODELS IN ARCHAEOLOGY, OR WHAT TO DO WITH A HEXAGONAL LATTICE. There has been increasing utilization of the central place model in archaeology. This utilization has revolved around the most distinctive feature of Christaller's model, the hexagonal lattice. Although the hexagonal lattice arrangement is theoretically elegant, the assumptions on which the model is based are rarely met and, furthermore, the hexagonal lattice has rarely been shown to exist. The principal problems with archaeological applications of this model are generally inadequate spatial and temporal bounding and failure to demonstrate that archaeological assemblages generally conform to Christaller's economic assumptions. (52)

Downer, Alan S., Jr. (see Green, P. R.) (52)

Druss, Mark (Virginia Commonwealth) COMPUTER ANALYSIS OF CHIUCHIU SETTLEMENT PATTERNS. The Chiuchiu complex (ca. 2700-1600 B.C.) is the final preceramic phase of the mid-Rio Loa sequence of the Atacama Desert, northern Chile. Settlement patterns include a variety of structural types ranging from small perishable structures to semisubterranean pit houses, habitation sites of varying seasons of occupation and varying degrees of permanence, and the practice of seasonal transhumance. Computer analysis of settlement pattern and environmental variables support the hypothesis that variation in settlement pattern is related to variation in environmental condition. (30)

Duncan, Kelley C. (Archeological Research Associates) ANALYSIS OF A BURNT ROCK MIDDEN SITE IN SOUTHEASTERN OKLAHOMA. Ms31 is a large site along the Arkansas River in southeastern Oklahoma. It covers about 35 acres and consists of large quantities of burnt sandstone and associated lithic materials. Much of the artifactual debris has been thermally altered. Analysis was undertaken to determine whether the material would support a hypothesis that an important function of the site was the thermal treatment of chert during the reduction process, and at what stage of the reduction sequence this might have occurred. The analysis was accomplished through various statistical tests, such as analysis of variance. (14)

Durbin, Marshall (Washington) LITERARY TRADITIONS AMONG THE MAYA. A detailed reading of Stela 3 at Piedras Negras, Guatemala, will be used as a backdrop from which literary traditions among the Maya are explored. In particular, Kubler's proposal that glyphs be read in clauses will be examined. The frequent appearance of 14 as a month coefficient leads to some new proposals for reading this stela. The literary style and the mode of presentation of information in this stela (being representative of the Southern Lowlands) are discussed in contrast to styles and modes of presentation in other Maya areas. (11)

Dyke, Bennett (Pennsylvania State) ON THE APPROPRIATE USE OF COMPUTER SIMULATION. There is a certain inevitable pattern in the way that computer simulation is (1) introduced to a field of the biological or behavioral sciences, (2) suffers critical abuse, and (3) is finally accepted as a useful research tool. This pattern is related to the appropriateness of the use to which simulation is put. This paper will discuss the "natural history" of simulation studies and will suggest the application of some general standards of appropriateness for its use. (15)

Earnest, Howard (Harvard) PRECLASSIC ARCHAEOLOGY OF CENTRAL EL SALVADOR. Analysis of artifacts from a series of Preclassic sites in the middle Lempa Valley of north-central El Salvador provides a basic material-culture time framework for the region. Data from central Salvadoran sites outside the valley are utilized, and comparisons and correlations with other Mesoamerican and Central American sequences are presented in preliminary form. Hypotheses concerning settlement patterns and economic adaptations of the Central Salvadoran Preclassic communities are also discussed. (36)

Eaton, Jack D. (Texas-San Antonio) ANCIENT AGRICULTURAL FARMSTEADS IN THE RIO BEC REGION OF YUCATAN. During the Maya Late Classic period (ca. A.D. 600-830) a specialized form of intensive agriculture was practiced throughout the Rio Bec region of Yucatan. Farmsteads comprised of groups of rectangular stone houses with plaster floors, and frequently with fenced enclosures, were excavated and analyzed. The farmsteads are situated on artificially terraced hillsides remote from the monumental centers and were part of a region-wide farming community. Structural details of the farm houses suggest that the farmers were also highly skilled masons employed for the construction of monumental buildings in the centers. (47)

Ebert, James I. (New Mexico) MOBILITY, CLIMATE, AND TECHNOLOGICAL SPECIALIZATION IN THE MIDDLE AND LATE STONE AGES OF SOUTHERN AFRICA. The temporal and technical aspects of the transition from Middle to Late Stone Age adaptations have long been a point of contention between archaeologists in southern Africa. Fieldwork conducted in Botswana in 1975-76 has resulted in the discovery of over 100 sites of these periods along the shorelines of now-dry Lake Makgadikgadi; an analysis of the lithic artifacts recovered indicates that differences in subsistence, specialization, and mobility in the last 100,000 years may be referable to human responses to changes in climatic cyclicity. (20)

Eddy, Frank W. (Colorado-Boulder) AN APPLICATION OF THE WYOMING PROJECTILE POINT CHRONOLOGY TO DATING OF AN EASTERN COLORADO FOOTHILLS SITE SURVEY. Dating of aboriginal sites of the Two Forks Archaeological Project located along the South Platte River in the foothills of eastern Colorado, was accomplished by four lines of chronological evidence, of which projectile point styles was the most useful. Due to the comparatively low number of points as well as little stratigraphic context, both relative and absolute age limits for the Two Forks projectile tips were derived by form comparison from outside the study district. Comparisons were made in two steps. The radiocarbon-dated Wyoming projectile point horizons were extrapolated to the deeply stratified Magic Mountain site near Golden, Colorado. Once the Magic Mountain relative point sequence had been dated, results were extended to the Two Forks surface collections. It was concluded that just over half the aboriginal sites at Two Forks spanned 7,000 years of occupation. Further, dated projectile point horizons, coordinated with alluvial, pottery, and historic artifact data, allowed subdivision of the Two Forks occupation into eight chronological periods, from Early Archaic to historic Ute. (19)

Edmonson, Munro S. (Tulane) MAYA HISTORIOGRAPHY. A Maya view of history is discussed in this paper. In the text of the Book of Chilam Balam of Chumayel one passage stands out as unique. It includes the only direct Colonial reference to the Classic long-count dating system. It is also written as a rebus with European symbols. The significance of this passage is discussed in relation to the calendrical system, the correlation problem, the nature of the writing system, and the Maya sense of history and ethnohistory. (11)

Effland, Richard (Arizona State) THE USE OF THE SARG DATA BANK IN HYPOTHESIS TESTING. The SARG data bank currently contains information on about 3,000 archaeological sites in the southwestern United States. A variety of hypotheses concerning the determinants of site locations can be tested using these data. Some of these hypotheses are identified and the results of the tests discussed. Problems that arise in carrying out such tests are also considered. In addition, the data bank can be used for a variety of purposes other than that for which it was specifically created. New variables can be generated, hypotheses unrelated to SARG tested, and computer-graphic techniques evaluated. A number of such applications are discussed. (10)

Eggers, A. V. (Archaeological Impact Services) EVIDENCE OF EARLY MAN IN THE WESTERN MOJAVE DESERT, CALIFORNIA. Excavations carried out in conjunction with the construction of the Space Shuttle Transport Road on Edwards AFB, California, led to the discovery of a site containing a Pinto Basin type assemblage in the Antelope Valley. The site was the first of its kind to be discovered in the western Mojave desert. Subsurface testing resulted in the recovery of Pinto Basin and Silver Lake type points in association with large quantities of artifacts made of local rhyolite. An olivella bead and obsidian artifacts were also associated. The latter artifact associations are indicative of the early establishment of trading patterns presently documented for the late prehistoric sites in southern California. It appears that this site represents the westernmost extension of the Desert tradition yet discovered in the Los Angeles area. (45)

Eighmy, Jeffrey L. (Arizona) LOGISTIC TRENDS IN SOUTHWEST POPULATION GROWTH. With the widespread influence of Ester Boserup's demonstration that subsistence intensification is caused by population growth, the idea that population growth is independent of subsistence strategies has also been widely adopted. However, to show that subsistence intensification is caused by population growth is not a demonstration that population growth is independent of subsistence strategies. Evidence presented here suggests that in a number of prehistoric Southwest cases population growth was not independent of environmental-subsistence constraints. In 13 of 14 possible cases, tree-ring dates indicate that population growth was density dependent and can be described by a logistic function with an average  $r^2$  of .97. (41)

Ekholm, Susanna M. (Brigham Young) THE NECROPOLIS ASPECT OF THE SOUTHWESTERN MAYA SITE OF LAGARTERO, CHIAPAS. Recent investigations at Lagartero indicate that parts of the ceremonial center served as cemeteries from the Middle Classic through Early Postclassic periods. The great number of burials encountered and their accompanying grave goods elucidate elite burial practices for the area and indicate chronological or functional differences between the funeral pottery and the large quantity of polychrome pottery apparently used in early Late Classic ceremonies. (55)

Ekland, Carolyn (Texas-Austin) DISCRIMINANT ANALYSIS OF FRAGMENTS FROM LONG BONE DIAPHYSES. Analysis of faunal remains from archaeological and paleontological sites is almost always restricted to dental and epiphyseal materials. Our research objective was to determine whether the method of fragmentation or the taxa could be predicted from fragments using shape characteristics only. In this pilot study, we have been able to use a small number of shape descriptors to make discriminations between fragments chewed by dogs and fragments broken by humans, and between cow, sheep, and deer bones. Thus, it may be possible that collections of bone fragments can be made to yield much more information than they do at present. (13)

Ellis, Florence Hawley (see Frisbie, T.) (32)

Engel, Frederic A. (Universidad Nacional Agraria) CHANGES IN THE SETTLEMENT PATTERNS ALONG THE ARID COAST OF PERU FROM 10,000 B.P. TO THE COLONIAL PERIOD. Many thousands of campsites, villages, cities, and monuments are found in the Andean highlands and coastal areas. To provide for a systematic survey of sites and collection of comparable data by different researchers, a questionnaire approach is used that stresses the recovery of morphological data and avoids functional interpretations. Location, altitude, environment, type of building, decorative elements, maps, etc. are kinds of information gathered. The results of this analysis are presented, containing information on building plans, settlement patterns, and a preliminary synthesis of geographical and temporal sequences for the Central Coast from 10,000 B.P. to the Colonial period. (49)

Engel, Frederic A. (see Benfer, R. A.) (39)

Epstein, Jeremiah F. (Texas-Austin) SOME PROBLEMS IN BAY ISLAND PREHISTORY. A detailed archaeological survey of the islands of Roatan and Utila, Islas de la Bahia, Honduras, indicates somewhat different settlement patterns for each island that may in part be due to topography or to the function of these islands in aboriginal culture. While modern villages are spread out along the coast, archaeological evidence of coastal occupations is rare. Most of the prehistoric sites are found in the interior, on the upper parts of hill slopes, where extensive agricultural terraces were constructed. These sites appear to have been chosen primarily for defensive purposes. (36)

Ericson, Jonathon E. (Los Angeles County Museum of Art) CHEMICAL CHARACTERIZATION OF CALIFORNIA OBSIDIAN: ISOLATING EXCHANGE SYSTEMS. Individual exchange systems of prehistoric California can now be isolated by applying the results of chemical characterization of obsidian sources and artifacts, source-specific obsidian hydration dating curves, and synagraphic mapping. A discussion of the methodology and examples are presented. (45)

Erickson, Clark L. (Illinois-Urbana) SUBSISTENCE IMPLICATIONS AND BOTANICAL ANALYSIS AT CHIRIPA. During 1974-75, a joint Bolivian-U.S. project was undertaken at the site of Chiripa, on the Altiplano of Bolivia (ca. 3800 meters above sea level). One major goal of the investigation by the U.S. collaborators was to apply the flotation technique of water separation for the recovery of botanical remains and small animal bone for the early

"premound" levels of the site, thought to date in the 1500-1000 B.C. period. Analysis of the recovered material indicates the cultivation of *Chenopodium* spp. and possibly potatoes (*Solanum* spp.). Other local economic plants are also represented. Suggested use of the various plants, the possibility of domestication, and aspects of the site's ecology are discussed. (49)

Essenpreis, Patricia S. (Harvard) FORT ANCIENT SETTLEMENT: A CASE STUDY OF RESPONSE AT A MISSISSIPPIAN-LATE WOODLAND INTERFACE. Fort Ancient culture is the reintegration of a variety of influences from several different Mississippian cultures by relatively independent and culturally distinct populations in the Ohio Valley. The differential adoption of proposed items and ideas by specific groups as well as differing nature and degree of interaction between such groups is responsible for the lack of specific burial patterns and village layouts for the Fort Ancient culture. As the Fort Ancient culture develops through the period from A.D. 1000 to A.D. 1700, the nature of external and internal dynamics change, making spurious the search for a single cause of origin such as invasion. A lack of understanding of chronological positioning of Fort Ancient sites and foci leave the consideration of Fort Ancient development wide open for speculation that cannot be substantiated by available data. However, such speculations can be formulated as testable models, the value of which can be examined through consideration of specific phases (or foci) such as the Anderson phase. Support for the variable impact of Middle Mississippian groups, other Fort Ancient groups, and the local Late Woodland populations can be demonstrated for this phase. (25)

Evans, David R. (see Ives, D. J.) (6)

Evett, Daniel (Wayne State) A TEST OF GENERALIZATIONS CONCERNING POST-PLEISTOCENE MAN-LAND RELATIONSHIPS: THE ITALIAN CASE. Several of the more widely stated generalizations regarding the nature of post-Pleistocene cultural developments from their postulated environmental provocations (called here the Environmental Impact Model), are examined in the light of data from the end of the Wurm and early Holocene Italy. Suitable tactics, both for translating the cultural and environmental data into workable variables, and for testing the Environmental Impact model are discussed. (16)

Ferguson, T. J. (Zuni Archaeological Enterprise) ARCHAEOLOGICAL INVESTIGATIONS AT PESCAZO SPRINGS, ZUNI INDIAN RESERVATION, NEW MEXICO. A report is made on archaeological investigations recently completed by the Zuni Archaeological Enterprise at the village of Pescado, a small farming community 14 miles west of the Zuni Pueblo. Background information on environmental setting and culture history is provided. Both the prehistoric and historic aspects of the occupation of Pescado are discussed. Results of ceramic analysis and architectural studies indicate the area was occupied intermittently from the thirteenth century to the present. Speculative ideas concerning the temporary abandonment of the Pescado area are considered. (41)

Ferguson, T. J. (see Dodge, W. A.) (43)

Fish, Paul R. (Georgia) FROM DEBITAGE TO BEHAVIOR: EXPLORING THE POTENTIAL. Debitage constitutes one of the least glamorous of artifact categories and a most neglected one in the realm of cultural inference. To change this undeserved image, the potential of debitage for the interpretation of behavioral patterns is discussed. In order to illustrate the application of debitage analysis in a number of specific instances, data from several Middle Paleolithic assemblages is cited. The locus of activities and selective processes in tool use and manufacture in a single site are inferred from kinds and distributions of debitage. Comparison of several cultural aspects between sites is also carried out on the basis of debitage attributes. (3)

Fish, Suzanne K. (Georgia) CULTIGENS, CULTIVATION, AND CHRONOLOGY: PALYNOLGY AT EDZNA. A series of pollen samples from architectural and stratigraphic contexts were analyzed for the project headed by Ray T. Matheny at Edzna, Campeche. Modern surface samples served as a guide to the archaeological pollen record. A number of cultigens were identified, and additional types of probable economic significance are suggested. Pollen spectra also provide clues to building activities, relative extent of cleared land, and chronological order among samples. (55)

Flattiger, Katherine (Chicago) NEW ASPECTS OF THE MOUSTERIAN FROM SOUTHERN AND EASTERN SPAIN. Based upon studies of Mousterian industries in eastern and southern Spain, the notable differences between the Mousterian of Spain and southeastern France are examined. Factor analysis and attribute analysis are used as aids in defining variability and in isolating functional aspects of the tool types. A number of hitherto unpublished sites are included in the study. (7)

Folan, William J. (Universidad de Yucatan) FRUIT, FIBER, AND BARK: THE SOCIAL ORGANIZATION OF A MAYA URBAN CENTER, COBA, QUINTANA ROO, MEXICO. Recent analysis of 3,474 trees recorded in the urban Maya center of Cobá, Quintana Roo, indicates a correlation between the location and quantity of certain fruit, bark, and fiber bearing trees, their distances from the center of the site toward the fringes and architectural shapes suggesting agreement between the residence pattern of Cobá and Diego de Landa's sixteenth century class-oriented description of Maya towns during Preconquest times. (55)

Foncarrada, Marta (UNAM) CACAXTLA PAINTINGS AND THEIR CALENDRIAL SIGNS. The recently discovered murals at Cacaxtla, Tlaxcala, Mexico, show a number of signs which are closely associated to the representations of human figures and are surely conferring a particular significance to these images. Some of these signs appear with numerals indicating a calendrical context that may be related to similar representations in painting and in other media in other sites. To establish these similarities within particular contexts should contribute to a better understanding of the iconography of the Cacaxtla mural painting and also of its chronological position in relation to other manifestations of Middle American art. (38)

Fowler, Melvin L. (Wisconsin-Milwaukee) CAHOKIA AND THE AMERICAN BOTTOMS: SETTLEMENT ARCHAEOLOGY. Settlement surveys have been conducted within the American Bottoms by several different institutions and research projects. These have been general surveys concerned primarily with site identification and location and not with defining site size and function. Various studies of the Cahokia site itself have been conducted. Limited though these data may be, some statements concerning settlement systems can be proposed for future testing. Cahokia was the major site of a stratified system of communities. Besides Cahokia there were second line communities made up of sites with several mounds and plazas located at strategic points in the valley. Below these were what may have been specialized productive communities and farmsteads. Some discussion of the development of this settlement system will be presented. (25)

Fowler, William R., Jr. (Calgary) A DEFINITION OF THE POSTCLASSIC PERIOD OF CENTRAL EL SALVADOR. This paper utilizes data from recent excavations in the middle Lempa Valley as well as from the excavations of the site of Cihuatán in central El Salvador to establish a working definition of the "Central Salvadoran Postclassic." Additional data are derived from the ethnohistoric literature. The frontier status of this region of Mesoamerica in the early Postclassic is evaluated. Lastly, the ethnic identity of the "Pipiles" is examined for its significance in evolutionary thought. (36)

Fox, Daniel E. (Texas Tech) BUSINESS-LIKE ARCHAEOLOGY: THE POTENTIAL FOR APPLICATION OF MANAGEMENT CONTROLS. With a continued increase in the volume of contract archaeology and a trend toward "conservation archaeology" (an adaptive response to a seemingly apparent need to make archaeology a publicly responsible institution of the American free enterprise system), the corresponding legal and nationally integrated nature of "the business" has attracted professional administrators who seek to standardize qualifications for practitioners, as well as for techniques and terminology. In an attempt to avoid the conflict of basic human values about whether or not individual archaeologists should be managed, this paper considers the potential for application of PERT (Program Evaluation and Review Technique) as a method of project analysis that might be employed by different contracting institutions. In conclusion, a discussion of potential benefits and problems inherent in the standardized application of management controls is offered. (26)

Fox, James A. (Stanford) ASPECTS OF MAYA ASTRONOMIC INSCRIPTIONS. The discovery of a Classic Maya inscription which records the observation of an astronomical event is announced in this paper. The implications of this inscription for the Maya calendar correlation, the understanding of Maya astronomy and astrology, and the general study of ancient astronomy are discussed. (11)

Fox, James A. (see Justeson, J. S.) (11)

Frantz, Roger S. (see Schneider, K. A.) (50)

Freimuth, Glenn (see Riley, T. J.) (6)

Frisbie, Ted (SIU-Edwardsville) A REVIEW OF ETHNOARCHAEOLOGY IN WESTERN UNITED STATES AND NORTH MEXICO. In those areas in which it is difficult to work, such as Zuni, Hopi, or the Rio Grande Pueblos, the ethnoarchaeological approach solves problems otherwise left hanging. In turn, one can aid Native American groups in problems such as those connected with recent land-claims cases; thus ethnoarchaeology may provide practical aid, as well as elucidation of theoretical problems. For little known groups such as the Seri, Tarahumara, Huichol, or Tepehuan in north Mexico, ethnoarchaeological studies preserve knowledge of material culture that is essential to understanding of possible prehistoric relationships of such cultures with the American Southwest and each other. The rare ethnoarchaeology work in California and the Great Basin is essential for understanding the still little known cultural development in these areas. (32)

Frison, George (Wyoming) BONE BUTCHERING TOOLS IN PREHISTORIC BISON KILL SITES. There is no doubt that bone tools were used in some aspects of butchering in bison kill sites from Paleo-Indian to historic times. Positive identification of these kinds of tools is often conjectural due to methods of tool manufacture, the kinds of evidence resulting from use, and varying preservation of the bones in archaeological contexts. A special problem is that chewing by carnivores can produce results that suggest human use. These are some considerations that archaeologists must carefully consider before describing certain bones as parts of butchering tool assemblages. (13)

Frison, George C. (see Reher, C. A.) (14)

Frost, Everett (see Shutler, M. E.) (24)

Frost, Jan (see Shutler, M. E.) (24)

Fuller, John W. (Washington) THE DEVELOPMENT OF LATE PREHISTORIC TOWN COMMUNITIES IN NORTHERN WEST VIRGINIA—THE TEST OF A MODEL. A research program concerned with the formulation and testing of archaeological models explaining the development of sedentary nucleated towns is outlined. Implicit in the extant literature is a growth model contending that town communities form by growth and population expansion of smaller hamlet communities. The consequences of this model are empirically tested and disproven by stylistic and functional analyses of surface survey data from West Virginia displayed by the computer mapping technique SYMAP. The growth model is shown to be ineffective, and a nucleation model contending that towns form through a compaction-redistribution of a given population in marginal environments is suggested. (6)

Gaines, Sylvia (Arizona State) THE EVOLUTION OF THE SARG COMPUTER FORMAT AND DATA BANK. The nature of the computer format employed in SARG research as well as participants' conception of the data bank have changed drastically over the years. The history of these changes is summarized and related to changes in the range design on the one hand and in the organization's understanding of computer technology on the other. Some of the lessons concerning data management that have been learned in the course of the SARG effort are identified. In particular, the utility of SPSS as a data bank management system is discussed. Changes in formatting and in data storage and retrieval procedures are considered. (10)

Galatin, Walton C. (Massachusetts) VALDIVIA MAIZE AND ITS SIGNIFICANCE. The early (ca. 4000 B.C.) appearance of a domestically evolved race of maize named Kcello in the coastal Ecuador site of San Pablo suggests earlier maize agriculture than generally presumed from the older domestication sequence at Tehuacan, Mexico. Mexican material of comparable age has less advanced kernels. Increases in kernel size involve polygenic selections by man that are poorly adapted in nature. While the chronology for archaeological maize indicates that the South American maize probably originated from a primitive Mexican maize introduced by man, once it became geographically isolated from its ancestral source, divergence was possible. The drift of a genetic capacity for kernel enlargement found fulfillment along a pathway toward increased productivity in South America because it was unfettered by teosinte introgression. Teosinte, the putative wild ancestor of maize found in Mexico, Guatemala, and Honduras, has a much thinner pericarp than maize and much smaller kernels. Hybrids of teosinte and maize may have inviable kernels because of the incongruous combination of genes for large kernels with genes for thin pericarp. In Mexico, kernel size remained relatively small; increased productivity was achieved by increases in row number and ear length. (22)

Gallagher, Joseph G. (SMU) AN ANALYSIS OF PREHISTORIC SETTLEMENT FUNCTIONS WITHIN THE BRANTLEY RESERVOIR, NEW MEXICO. Recent archaeological surveys in the area north of Carlsbad, New Mexico, have demonstrated a diversity of morphological site types along the Pecos River over the past 2,000 years. The functional interrelationship of these sites was modeled using ethnographic data on the settlement-subsistence patterns of the Mescalero Apache. Subsequent research has sought to test both the morphological and functional models of sites. Tests of these models and their reevaluation in light of recent studies on the reconstructed environment are presented. (27)

Gardner, Joan (Texas Tech) TEXTILES FROM SPIRO MOUND, OKLAHOMA. Recent analysis of Spiro Mound textiles in the collection of the U.S. National Museum, Smithsonian Institution, has led to some rather startling discoveries. Many of the fabrics have proven to be made of spun turkey down, colored with plant dyes. Designs on twined tapestry fragments are clearly related to those on the well-known engraved conch shells. The textile industry appears to resemble that of the Northwest Coast in several ways. (17)

Garrison, Ervan G. (Missouri-Columbia) DIMENSIONAL ANALYSIS OF VARIANCE AND LOCATIONAL ANALYSIS. Dimensional analysis of variance has been used to correlate artifact concentrations to arbitrary parameters (Whallon 1973; Brose 1973). This paper examines the potential of this technique for detecting spatial limits of settlement systems. (52)

Garza, Sylvia (INAH) REMOTE SENSING IN THE YUCATAN PENINSULA. The Centro Regionale de Sureste, INAH, has been using remote sensing techniques to locate and study Precolumbian sites for the past two years. Landsat imagery provided an overall perspective of ecological zones. Standard small to medium scale aerial photography, originally taken by various agencies for purposes other than architectural research was searched for evidence of architecture. More detailed photos of individual sites were taken from the helicopter. Precise location of sites and causeways between them were plotted on 1/100,000 topographic maps. Defensive walls surrounding several sites were noted. Information about both key centers such as Uxmal, Izamal, Chichen Itza, and numerous smaller architectural complexes is being compared in order to formulate definitive statements about community form and settlement systems. (31)

Gerstle, Andrea (Colorado-Boulder) TOOL MANUFACTURE AT SABANA GRANDE, NICARAGUA. Chipped stone artifacts and debitage recovered from a single mound at the site of Sabana Grande, Nicaragua, by Richard Magnus are analyzed with a view to identifying patterns in tool manufacturing behavior. A behavioral model of tool manufacture is proposed on the basis of an initial intuitive classification of artifacts into core, blank, preform, and tool categories. The proposed reduction sequence is then tested and verified with statistical (principal components) analysis of a sample of complete unmodified debitage flakes. The model is subsequently refined by analysis of additional flake types—flake tools and resharpening flakes. The completed model is examined for characteristics which may apply to distinguishing tool manufacture at Sabana Grande from other areas. (3)

Gifford, Diane (California-Santa Cruz) AFRICAN HUNTERS AND GATHERERS: ETHNO-ARCHAEOLOGY. Ethnoarchaeological studies of hunting-gathering peoples in Subsaharan Africa have had several effects. At the local level, they have served to elucidate regional archaeological problems by providing direct historic models of resource utilization and settlement patterns. On the level of general models of prehistoric hunter-gatherer behavior, social organization, and ecology in tropical zones, ethnoarchaeological studies have substantially contributed to the refinement of such models. At yet another level of generalization, these studies may be used to form and/or test general hypotheses regarding both human relations to material culture and to the environment, and site formation processes. (24)

Gifford, Diane (see Ammerman, A.) (15)

Gilman, Pat (Mimbres Foundation) A SYNTHESIS OF THE CLASSIC MIMBRES PHASE WITH SPECIAL EMPHASIS ON THE MATTOCKS SITE. Using both previously published information and data from recent work in the Mimbres Valley, a synthesis of the Classic Mimbres phase will be given. Possible reasons for apparent differences in site size and function of habitation sites will be considered, as will a model for change during the Classic phase. Recent excavations on the Mattocks site will be used to exemplify these points, and intrasite room functions, activity areas, developmental sequences, and length of occupation will be discussed. (1)

Goad, Sharon I. (Georgia) EXCHANGE NETWORKS IN THE SOUTHEASTERN UNITED STATES. Exchange networks in the southeastern United States have been vaguely defined as long distance routes linking the southeast with the Great Lakes and Illinois Valley. Recent quantitative studies have indicated that although some artifacts were manufactured from raw materials originating in these northern areas, the majority of these artifacts were made from indigenous source material. This paper reports on the quantitative analysis of a number of copper artifacts from the Southeast and reviews the concept of southeastern exchange in light of these findings. (53)

Goldstein, Lynne (Wisconsin-Milwaukee) CULTURAL PERIODS VS. CULTURAL SYSTEMS: DOES SHELL-TEMPERED POTTERY A MISSISSIPPIAN MAKE? Archaeologists often assign sites to cultural periods on the basis of the presence of certain material items. This approach can lead to difficulties because: (1) the absence of such items does not necessarily imply that the site is of another period; (2) we are applying, in many cases, simple monothetic definitions to complex polythetic situations; and, most importantly, (3) we often fail to understand the differences between a cultural period and a cultural system. Using Mississippian society as an example, it will be shown that while certain items may be markers for the cultural period, they are not necessarily markers for Mississippian cultural systems. Ideas for clarifying these conceptual difficulties will be suggested. (29)

Goodyear, Albert (see Smith, L. D.) (3)

Gorman, Frederick (Boston) PROBLEM-ORIENTED RESEARCH IN HISTORICAL ARCHAEOLOGY: INDUSTRIAL ORGANIZATION OF TECHNOLOGY AND LABOR IN EIGHTEENTH CENTURY GLASS MANUFACTURING. Historical evidence suggests that fundamental ideas about the organization of technology and labor that define the early nineteenth century industrial revolution in America were previously operative in late eighteenth century glass manufactories. Hypotheses about patterns of material culture that might be expected to characterize glass manufacture during the American Revolution and after are tested to determine whether this war created production and marketing conditions that anticipated the Industrial Revolution. Ethnohistoric and archaeological data collected from two eighteenth century residential glass houses are used in the tests to make inferences about industrial community planning, product standardization, and workers' material standard of living. (42)

Grady, James (Colorado-Boulder) ANIMAL BEHAVIOR PATTERNS AS AN ECONOMIC DETERMINANT OF ARCHAEOLOGICAL SITE LOCATION. Large herbivorous herd animals have traditionally made up the bulk of the protein intake of hunters and gatherers. Understanding the movement of these animals, how and why they behave as they do, is an essential step in clarifying the economic behavior of man. Hunting as a concept is abandoned and the concept of overlapping behavioral systems, the man-animal relationship, is substituted. The basic thesis is drawn from the behavior of mule deer (*Odocoileus hemionus hemionus*) and site distribution in western Colorado. (5)

Grady, James (see Hester, J. J.) (23)

Grady, Mark A. (SMU) RESEARCH DESIGNS AND CULTURAL RESOURCE MANAGEMENT: SOME PRACTICAL CONSIDERATIONS. Research designs are as necessary a part of contract-sponsored research as they are of any other form of archaeological investigation. The nature of archaeological resource management studies, however, requires that problem orientation be developed after the research area has been circumscribed. The implications of this issue are examined, and a number of solutions relative to different phases of cultural resource management are proposed. Emphasis is placed on the fact that research design development, an important and scholarly endeavor, must be funded as an integral component of the management project. (26)

Grady, Mark A. (see Morenon, E. P.) (43)

Graham, Elizabeth A. (Cambridge) ARCHAEOLOGY IN THE STANN CREEK DISTRICT, BELIZE, CENTRAL AMERICA. Abstract not available. (47)

Grant, Phillip (see Ekland, C.) (13)

Graves, Michael W. (Arizona) ARCHAEOLOGICAL SURFACE DEPOSIT METHODOLOGY. This paper describes traditional ways in which surface deposits have been investigated to answer archaeological research questions. It is argued that the potential of surface deposits as archaeological context phenomena has yet to be realized. Several areas in which surface deposits can provide reliable information are described, as well as appropriate field and analytical methods for extracting this information. Examples from the Grasshopper region, Arizona, provide illustrative support. (37)

Graybill, Donald A. (Georgia) THE UTILITY OF THE RANK-SIZE RULE IN ARCHAEOLOGICAL RESEARCH. The rank-size relationships exhibited by modern settlements that have been observed by geographers are examined for purposes of determining the utility and applicability of these regularities in attempts to understand prehistoric settlement system phenomena. (29)

Grayson, Donald K. (Washington) MT. MAZAMA, MIDDLE HOLOCENE CLIMATIC CHANGE, AND NONEQUILIBRIUM INSULAR BIOGEOGRAPHY IN THE NORTHERN GREAT BASIN. Analysis of vertebrate archaeofaunas from the Fort Rock Basin, south-central Oregon, lends confirmation to the hypothesis that the eruption of Mt. Mazama (ca. 7000 B.P.) was superimposed upon an increasingly xeric environment. This superimposition is indicated by numerous shifts in taxonomic abundance within the archaeofaunas. The effects of these events upon humans are poorly known. The mid-Holocene disappearance of pikas (*Ochotona princeps*) is explained by these events, and confirms the hypothesis that the distribution of boreal mammals on mountainous islands within the Great Basin is accounted for by initial Pleistocene colonization followed by extinctions of geographically intermediate populations. (4)

Greber, N'omi (Cleveland Museum of Natural History) THE USE OF NONPARAMETRIC STATISTICAL RANKING PROCEDURES IN THE ANALYSIS OF HOPEWELL BURIAL PATTERNS FOUND IN SEIP MOUND 1, ROSS COUNTY, OHIO. Based on a methodological framework of ranking variables, ranksums, and nonparametric comparison tests, a detailed description of burial attributes for each individual of a burial population permits identification of components of the social structure (defined as identifiable groups of individuals) and interpretation of social organization (defined as relationships within and between components). Descriptive variables include measures of tomb size and materials, burial form, associated artifacts, age and sex when available, and relative location within the burial population. Results of analysis of the burial population within Seip Mound 1 show that the associated living population consisted of three ranked major divisions, with differentiated subgroups within each. These major divisions are associated with contiguous, but separable, physical space and differential distribution of specific sociotechnic items. An hypothesized similar social structure is suggested for some, but not all, of the other Hopewellian peoples of the local geographic area. (17)

Green, Dee F. (USDA Forest Service) THE EVOLUTION OF THE SARG RESEARCH DESIGN. The original SARG research design was a compromise between individuals with divergent research concerns and interests. All aspects of the research design have been modified over the years. What, in print, may have seemed simple and easy changes in the research design have generally reflected long periods of discussion and debate. The history of the research design is discussed. Both basic changes and basic continuities are identified. (10)

Green, Dee F. (see Green, E.) (50)

Green, Ernestine (USDA Forest Service) SOME IMPLICATIONS OF LAND-USE PLANNING FOR ARCHAEOLOGICAL METHOD AND THEORY. The need for archaeological input into planning documents that cover large land surfaces of several hundred thousand acres is giving archaeologists an opportunity to observe the past on a scale and with a scope never before possible. Data gathering at such a magnitude has serious implications for the development of both method and theory within the discipline. Several of these implications

are explored, and it is suggested that archaeologists have an unparalleled opportunity for looking at the past in a new framework. (50)

Green, Margie (Arizona State) ANALYSIS OF CHIPPED STONE RAW MATERIALS FOR BLACK MESA. Chipped stone artifacts occur in low frequencies at sites on Black Mesa. While it was once held that this phenomenon reflected the limited availability of raw materials, a recent source survey indicated that lithic raw materials were readily available to prehistoric populations in the area. This paper describes the results of that source survey. The differential abundance of raw materials from distant and nearby sources found on Black Mesa sites is analyzed to determine what technological and organizational variables affected the movement of materials. Statistical tests of alternative hypotheses are discussed. (51)

Green, Paul R. (Missouri-Columbia) NETWORK APPROACHES TO SETTLEMENT ARCHAEOLOGY. A persistent shortcoming of locational studies in archaeology is the inability to provide techniques that can identify and aid in the understanding of objective regional (cultural) groupings. A large area in the Old World with a well-documented road network was investigated using factor analysis and circuit network techniques. The results of these analyses were then compared to an ethnohistoric analysis of the region. Thus the utility of network analysis can be compared to the "emic" reality revealed by the ethnohistoric data. These analytical techniques are then evaluated with respect to their usefulness in distinguishing real regional-cultural groups of sites. (52)

Green, Stanton W. (South Carolina) THE STATISTICAL ANALYSIS OF ENVIRONMENTAL VARIATION: A MAPPING APPROACH. Archaeologists are often confronted with the problem of describing the environmental variability of a region from a large set of variables. This paper offers a methodology for delimiting and describing the spatial variability of climatic and geographic variables that condition agricultural land value. Using historic data, we evaluate several multivariate statistical methods for deriving variables that account for variation in agricultural land values in Denmark. Trend surface analysis is employed as a means of spatial description and to generate hypotheses concerning land use and settlement patterns. This methodology shows strong potential for studying the relationship between historic and prehistoric land use and ecological systems. (5)

Green, Thomas J. (Idaho Historical Society) MISSISSIPPIAN SETTLEMENT PATTERNS IN SOUTHWESTERN INDIANA. Early (ca. A.D. 1200-1500) and late (ca. A.D. 1500-1700) Mississippian settlement patterns in southwestern Indiana are described. The description outlines the categories of settlements occupied, the distribution of these communities with respect to the landscape and each other, and an assessment of the accuracy and reliability of the current information available for settlement pattern discernment in this region. The similarities and differences in settlement patterns and the inferred settlement systems are described. An explanation is offered for the similarities and differences that is based on ethnographic analogy and economic theory. (25)

Greer, John W. (see Benfer, R. A.) (39)

Greer, John W. (Missouri-Columbia) LA PALOMA, A MIDDLE PRECERAMIC VILLAGE ON THE CENTRAL PERUVIAN COAST: INTRODUCTION TO THE 1976 EXCAVATIONS. La Paloma is a preagricultural maritime village located just north of the Chilca Valley. The five major stratigraphic zones contain abundant cultural debris, houses, burials, and other features dating 6500-4900 B.P. An adjacent sector of the same site contains a cotton preceramic village (dated at 3900-4100 B.P.). During the first season joint investigation was carried out by the University of Missouri-Columbia (UMC) and the Centro de Investigaciones de Zonas Aridas (CIZA) of the Universidad Nacional Agraria in Lima. An estimated 10% of the main part of the village has been minimally tested. The primary project interests generally center around demography and health, but include settlement pattern, mortuary practices, subsistence and ecology, microevolution, geology, geography, archaeobotany, zooarchaeology, and more. (30)

Greiser, T. Weber (Colorado-Boulder) THE JONES-MILLER HELL GAP SITE BONE TOOL ASSEMBLAGE. The analysis of the bison remains from the Jones-Miller bison butchering site in eastern Colorado resulted in the observation of significant patterns of breakage due to preparation and utilization of certain bone elements for tools. A systematic analysis of the 41,000 bones and bone fragments produced several hundred bone tools. These tools were identified by specific breakage patterns, polish, flake removal, and other evidence of use-wear. The majority of these implements are long bones although ribs, mandibles, and acetabulae are also represented in this bone tool inventory. A typology of bone implements based on the specific elements, breakage patterns, and inferred utilization is presented. Additionally, the distribution of bone tools in relation to unutilized faunal remains and lithic implements is discussed in terms of activity areas. A better understanding of Paleo-Indian bison butchering practices has resulted from the analysis of the Jones-Miller faunal assemblage. (13)

Griffin, P. Bion (Hawaii) ETHNOARCHAEOLOGICAL RESEARCH IN ASIA. A brief review of the ethnoarchaeological research that is known to the authors from South, Southeast, and East Asia is followed by a more detailed look by Solheim at ethnoarchaeological research that has been done with pottery in Southeast Asia and by Griffin at

the research in the Philippines with hunters and gatherers. On the basis of recent experience we look at some specific ethnoarchaeological and archaeological problems worthy of research in Irian, Java, Indonesia, and the Philippines. (24)

Guillen, Ann Cyphers (UNAM) A SERIATION OF CHALCATZINGO CERAMICS. The use of computer programs for the calculation of the Robinson-Brainerd correlation coefficients and for the best ordering of their seriation matrix have advantages of speed and efficiency in the ordering of large collections of data, such as the pottery sample from Chalcatzingo, Morelos, Mexico. Two seriations of the same collections were conducted: the first based on the frequency of types; and the second based on the frequency of form attributes. Comparison of the two final patterns and of stratigraphic order reveals not only time change but also spatial-functional variation at Chalcatzingo.(2)

Gunn, Joel D. (Texas-San Antonio) LINEAR DISTRIBUTION ANALYSIS. A whole literature has evolved around the question of whether a given tool type is or is not clustered on an occupation floor. Since comparison of distributions between tool types has been based on impressions, methodologies have been only marginally involved with the pattern of cultural debris on an occupation floor and what tool kits can be inferred from that pattern. They might serve as significance tests once a pattern has been inferred but are not appropriate numerical methodologies for generating hypotheses of relationships between functional entities. This paper outlines a method for determining intertype distributions based on linear models. The method is capable of discovering combinations of tool types that can be considered possible tool kits and the locational patterns of those tool kits. (29)

Gunn, Joel D. (see Adovasio, J. M.) (6)

Gunnerson, James H. (Nebraska) HISTORIC INDIAN OCCUPATIONS IN THE UPPER PECOS AREA. That portion of the upper Pecos drainage in or near the eastern foothills of the Sangre de Cristo Mountains (in northeastern New Mexico) was an important contact area for Plains and Pueblo Indians. One of the best travel routes between the Plains and the Southwest crossed the upper Pecos drainage and the mountains near Pecos Pueblo. The upper Pecos and nearby areas had long been an eastern outpost of horticultural Pueblo populations and in early historic times provided attractive farm land for Apaches coming in from the Plains. Archaeological and ethnohistorical evidence documents not only the relationship between man and environment but also the nature and extent of exchange between Plains and Southwestern peoples in this cultural interface. (27)

Gustafson, C. E. (see Wessen, G. C.) (44)

Hackenberger, Steven (Museum of the Great Plains) EXPERIMENTAL DESIGNS IN ARCHAEOLOGICAL RESEARCH: PREPACKAGED PROCEDURAL SETS IN LOGIC AND STATISTICAL ANALYSIS. In a restricted sense, the term experimental design denotes particular sets of procedures for structuring and controlling observations, and the "prepackaged" logic and statistical analysis associated with such sets. The recognition and possible use of such experimental designs within archaeology may ease and promote the structuring of archaeological research. This paper will aim to present an idea of some of the depth and range of design possibilities at separate levels of archaeological research, and to compare and contrast the mode of experimental designs with the mode of present analytical procedure practices. (29)

Hailey, Larry D. (Tulsa) LANDMARK FEATURES AS AN AID TO SITE LOCATION ANALYSIS. This is a statistical analysis of stream course features and natural land-formations as an aid in locating sites. Data for research was extracted from a 330 mi long transect across Oklahoma. The hypothesis tested was the possibility of sites occurring in relation to easily distinguished landmarks because of their use as aids in land navigation. (29)

Hall, Robert (see Kehoe, T. F.) (32)

Hamilton, Margaret E. (Delaware) HUMAN SEXUAL DIMORPHISM AND SUBSISTENCE PATTERNS IN THE ARCHAEOLOGICAL RECORD. An initial study predicted and demonstrated a decrease in the magnitude of sexual dimorphism in size in five osteological Amerindian populations with the transition from hunting and gathering to agriculture. This phenotypic change can be brought about by shifts in the selective forces affecting one sex (warfare, pregnancy, childbirth, or lactation), or both (subsistence activities and diet). Two additional groups have been measured from the lower Illinois River Valley and are compared with three of the original five groups also from the same area. Phenotypic changes in the magnitude of sexual dimorphism in size reflect the shifting patterns of subsistence demonstrated in these archaeological populations. (44)

Hammond, Norman (Cambridge) SECOND TO FOURTH MILLENNIUM B.C. RADIOCARBON DATES FOR THE MAYA LOWLANDS. Recent radiocarbon dates for the Maya Lowland site of Cuello of between 1000 B.C. and 3200 B.C. are described and discussed. (47)

Hammond, Norman (see Lowe, G. W.) (21)

Hantman, Jeff (Arizona State) ANALYSIS OF CERAMIC DESIGN—AN EXAMPLE OF MICRO-SERIATION. Southwestern archaeologists often order traditional ceramic types to

obtain relative temporal control of data, i.e., seriation. There are two problems with traditional seriation: (1) it produces a record of change with inadequately large temporal levels of analysis; and (2) it is based on untested assumptions about rates of change and the directionality of change. Finer temporal controls are necessary to produce an understanding of behavioral change. Micro-seriation provides a method for achieving these controls. Ceramics collected near Springerville, Arizona, provide the data base for application of this method. Attributes measured are design elements and proportions. Similar sherds are grouped using the H-Clus II cluster program, and discriminant analysis is done to determine relevant attributes. Finally, sites are grouped by seriating relative occurrences of "clusters" at a site. Temporal ordering of groups and determination of rates of change will be tested with collections from sites of known dates in east-central Arizona. (40)

Hardin, Margaret (see Arnold, D.) (32)

Hardwick, Robert H. (Hardwick and Associates) TECHNICAL AND FISCAL CONSIDERATIONS OF IMAGERY ACQUISITION IN CENTRAL AMERICA. Two sources of remote sensing and aerial photographic imagery are considered. The first source is imagery that is currently available and on file. Holding agencies are identified and costs are discussed. Both archaeological and technical limitations are identified. The second source, that of contracting original imagery, is also described. Pertinent factors such as cost; types of imagery, i.e., black and white, multi-spectral, color, false color IR, heat sensing, and radar; seasonal limitations; climatic factors; sun angle; and the stipulations and restrictions imposed by the host country on aerial reconnaissance flights are outlined. (23)

Harlan, Mark E. (New Mexico) EARLY AND MIDDLE FORMATIVE FIGURINES FROM CHALCATZINGO, MORELOS, MEXICO. During the 1972, 1973, and 1974 field seasons of the Chalcatzingo Project, approximately 5,000 fragments of Early and Middle Formative figurines were excavated. This research report will present the following information about those figurines: (1) the range of variability in the collection, (2) the chronological placements of the types, and (3) the spatial distribution of the variability on the site. A brief conclusion will be drawn concerning the meaning of patterned variability in the collection. (34)

Harn, Alan D. (Dickson Mounds Museum) MISSISSIPPIAN SETTLEMENT PATTERNS IN THE CENTRAL ILLINOIS RIVER VALLEY. The spatial distribution of Mississippian sites in the central Illinois River Valley is examined and various social and environmental factors influencing site locations are discussed. Data are presented to suggest that space utilization and internal structuring can be studied at four distinct levels within the Spoon River society: regional, community, individual site, and individual habitation. Site size and proposed function are weighed against topographic setting, water resource, soil type, vegetational context, and seasonality in an analysis of the Larson community, a post-A.D. 1200 Larson phase aggregation of some 40 sites. It is proposed that, while site distribution was nonrandom, it was influenced more by primary articulation with the natural environment than by sociopolitical organization. (25)

Harrold, Francis B., Jr. (Chicago) A REAPPRAISAL OF THE CHATELPERRONIAN. The Chatelperronian industrial tradition is the earliest manifestation of the Upper Paleolithic in France and Cantabrian Spain. It embodies the transition from Middle to Upper Paleolithic, which is felt by most Paleolithic archaeologists to involve not only a shift from flake to blade predominance in stone tool assemblages, but changes in human lifeways and physical types as well. A brief summary is given of the temporal range (about 35,000 to 32,000 years ago) and environmental milieu implied by the paleoclimatic, radiometric, and faunal evidence from Chatelperronian sites, and the implications of the scanty human skeletal evidence. Results are presented of typological studies using statistical techniques to attack two problems: (1) The typological dimensions of the Chatelperronian itself; and (2) Detailed comparisons with two other traditions that, in current French theory, share a continuity of cultural tradition with the Chatelperronian—the earlier Mousterian of Acheulean tradition and the later Gravettian. The conclusions of the study are presented, and discussed in terms of the place and meaning of the Chatelperronian, not only in the French and Spanish sequences, but in the larger process of transition from Middle to Upper Paleolithic. (7)

Hastorf, Christine (UCLA) RESOURCE UTILIZATION IN THE MIMBRES RIVER VALLEY: A CATCHMENT ANALYSIS. An economic energy minimization model is applied to the major resource yields, using site catchment analysis. Three site catchments are determined, all from the same spatial locus within the valley but spanning a period from A.D. 700 to A.D. 1450. From these constructions, diachronic shifts in resource uses are predicted. These predictions are then related to the sites' archaeological data. Additional hypotheses for interpreting the data, and a discussion of limitations of the model are given. (1)

Hatch, James W. (Pennsylvania State) MEASURING THE EFFECTS OF SAMPLING ERROR IN CERAMIC FREQUENCY SERIATION. The chronological ordering of ceramic samples is commonly undertaken by employing frequency seriation. However, recent theoretical articles concerning its use with ceramics suggest that the ordered sequence is effected by a large number of social and technological variables. The specific values associated with these variables clearly affect the chronological reliability of the resulting sequence, yet their actual impact has rarely been explored. This paper will report on (1) a

newly developed computer program (POTS) which dynamically simulates critical aspects of the manufacture, breakage, and accumulation of sherds in a ceramic-using village whose data parameters are known, and (2) the results and implications of applying standard seriation techniques for a chronological ordering of these data. The theoretical implications of the simulation as a research tool will be discussed, along with specific techniques of operationalization and substantive research results. (15)

Haviser, Jay B. (Florida State) CERAMIC AND LITHIC TYPOLOGY FOR THE VIRGIN ISLANDS NATIONAL PARK. An analysis of aboriginal ceramic and lithic materials recovered from the Virgin Islands National Park and study of their relationships with materials from Puerto Rico and the Lesser Antilles has allowed the formulation of typologies for these artifacts. Quantitative analysis techniques were employed as the most efficient methods of establishing these typologies due to the restricted geographic area involved. Multivariate analysis methods were used on the lithic materials to synthesize the archaeological evidence of the aboriginal inhabitants. (12)

Hay, Conran A. (Pennsylvania State) VARIABILITY IN WEAR PATTERNS ON OBSIDIAN FLAKES. Examination of wear patterns on the edges of several obsidian blade fragments from Kaminaljuyu, Guatemala, at the high magnifications possible with scanning electron microscopy, revealed variations in the morphology of use-scratches that were not obvious with optical techniques. On some edges, scratches consist of clean-cut grooves, whereas on others they may resemble lines of micro-chatter markings. An experimental program was initiated to investigate the cause of these differences, with the specific aim of determining whether variations in use-scratch morphology could be profitably employed in functional analysis. Fresh obsidian flakes were used to cut and scrape various materials, and the resulting wear patterns were examined using both optical and scanning electron microscopy. The results of these experiments, and their implications for functional analyses are reported. (3)

Hayden, Brian (Simon Fraser) ETHNOARCHAEOLOGY IN AUSTRALIA: A REVIEW. During the twentieth century, archaeologists' relationship to Australian and New Guinean ethnographic opportunities for understanding chipped stone hunter/gatherer technologies has been characterized by intense avoidance. By mid-century, opportunities for observing the full range of lithic manufacture, use, and context was seriously eroded, and it is dubious if any individuals with full knowledge in these areas will exist beyond the present decade. Profitable work is still possible however on many ecologically and socially related aspects of interest to archaeologists, including traditional use of sites and the environment, ritual relationships to ecology, movement schedules, types of group boundaries, and residential patterning. (24)

Hays, T. R. (North Texas State) A REEXAMINATION OF THE ARCHAIC-NEO-AMERICAN TRANSITION IN NORTH-CENTRAL TEXAS. Archaeological research on prehistoric occupation of north-central Texas has increased as a result of projects sponsored by various governmental agencies, including site surveys, testing, and excavation. This report presents preliminary results of excavations at Northlake, a Late Archaic-Transitional site located southeast of Coppell, Dallas County, Texas. Analysis of excavated material suggests that a reexamination of Late Archaic to Neo-American cultural development in north-central Texas may be necessary. Hypotheses of cultural change were formulated and tested using a variety of techniques. Cultural material found to be significant indicators of change were lithic artifact raw materials, ceramics, ground stone, and worked bone. Results of the research indicate the need to modify previous theories regarding the late Archaic-Transitional stage (1) chronology, (2) subsistence patterns, and (3) cultural affiliations. (19)

Healy, Paul F. (Trent) THE ARCHAEOLOGY OF NORTHEAST HONDURAS: PRELIMINARY REPORT ON THE 1975 AND 1976 RESEARCH. Archaeological research in the Trujillo-Aguan River Valley regions (Department of Colon), northeast Honduras, in 1975-76, has produced data on the Precolumbian settlement, subsistence, trade, and technological patterns prevalent in the region and has begun to clarify the culture history of this important frontier zone. Two sites, H-CN-5:Selin, and H-CN-12:Rio Claro, dating to the Selin and Cocal periods respectively, are compared, the data discussed, and the first chronometric age determinations for the region are outlined. (36)

Henderson, John (Cornell) NORTHWESTERN HONDURAS AND THE EASTERN MAYA FRONTIER. Historical evidence indicates that, at the time of the Spanish conquest, Naco, an important commercial center participating in an extensive exchange network, was near the boundary between Maya and non-Maya speech. Recent survey and excavations in the Valle de Naco confirm Naco's Postclassic commercial importance and suggest that a comparable situation prevailed during the Classic period. Long-distance exchange was an important mechanism of communication within Mesoamerica and across its eastern frontier. Traditional concepts such as the "port of trade" do not adequately reflect the complexity of the interactions suggested by historical sources, and standard analytical techniques are not well suited to detecting the subtle reflections of these interactions in archaeological evidence. (36)

Henry, Donald O. (Tulsa) A REPORT ON THE EXCAVATIONS AT HAYONIM TERRACE, WESTERN GALILEE, NORTHERN ISRAEL: 1974 AND 1975 SEASONS. The paper summarizes the archaeological, palynological, and zooarchaeological data

recovered from the excavations of an Epipaleolithic site containing Natufian and Kebaran horizons. The evidence is discussed in respect to reconstructing Epipaleolithic adaptive strategies and the origin of food producing economies in the region. (33)

Herrington, La Verne (Texas-Austin) PREHISTORIC FIELD AND IRRIGATION SYSTEMS OF THE RIO DE ARENAS AND CAMERON CREEK DRAINAGES, GRANT COUNTY, NEW MEXICO. Evaluation of ASCS aerial photographs revealed regular patterns on the floodplain of the Rio de Arenas and Cameron Creek drainages in Grant County, New Mexico. Subsequent ground reconnaissance and photography using panchromatic, black and white, infrared, and color infrared film defined an irrigation canal system and the presence of irrigated plots on the flood plain. A series of check dams on adjacent slopes were discovered solely using color infrared imagery. The agricultural system is probably associated with the Mimbres phase of the Mogollon. (31)

Hester, James J. (Colorado-Boulder) AERIAL PHOTO INTERPRETATION OF THE COPAN CEREMONIAL CENTER. Aerial photo reconnaissance flights over the ceremonial center of Copan, Honduras, in May 1976, have revealed the following: (1) individual buildings less than one meter high could be located and identified under forest canopy, adding 50 unmapped mounds and doubling the size of the ceremonial center; (2) course of the Sabe originally mapped by the Carnegie Institution can be traced across plowed fields and through the central plaza, changing our view of the plaza's geographic orientation; (3) mapping of soil color changes, using color IR imagery, offers the possibility of reconstruction of portions of the central acropolis eroded by the Rio Copan. This preliminary use of aerial photography at Copan indicates that its utility in Mesoamerica is greater than previously realized. (23)

Hester, Thomas R. (Texas-San Antonio) RECENT ARCHAEOLOGICAL STUDIES AT BAKER CAVE, VAL VERDE COUNTY, TEXAS. During summer 1976 a field party from the University of Texas at San Antonio conducted additional archaeological research at Baker Cave, a stratified rockshelter in Val Verde County, Texas. Earlier work at the site by James H. Word (Floydada, Texas) had revealed the presence of a late Paleo-Indian occupation (the Golondrina horizon of ca. 7000 B.C.) at the base of the shelter deposits. As a result of the 1976 investigations, new information was obtained on this early occupation, particularly in the areas of technology, subsistence, and local environment. Of significance was the discovery of a large hearth in the Golondrina stratum. The entire hearth fill (over 200 lbs.) was removed for laboratory processing. Constituents of the fill include an abundance of fish bones, seeds, walnuts, and other materials significant to studies of late Pleistocene subsistence and environment in the region. Also obtained through the 1976 research project was added information on the earliest Archaic utilization of the shelter. (35)

Hevly, Richard H. (Northern Arizona) BIOTIC EFFECTS OF VOLCANISM AND PALEOClimATIC CHANGE IN THE VICINITY OF FLAGSTAFF, ARIZONA, A.D. 1050-1300. Animal and plant remains were used to reconstruct the paleoecology in the vicinity of Flagstaff from the time of the eruption of Sunset Crater (A.D. 1065) to the end of human habitation of the area (A.D. 1250-1300). Assessment of the relative significance of volcanic, cultural, and climatic effects suggests that the latter may have been of greater importance to the prehistoric biota (including man). (4)

Hietala, Harold J. (SMU) SEDENTISM IN THE MOUSTERIAN: A CASE STUDY. An open-air Mousterian site in the Central Negev, Israel, is spatially analyzed relative to the problems of tool kit identification and locational consistency of depositional material. Potential tool kits are posited and a conclusion of continuous occupation seems to have considerable merit. (33)

Hilbert, Peter Paul (Philipps-Marburg) THE EARLY FORMATIVE IN THE TROMBETAS REGION OF THE AMAZON. Red and white ceramics with a date of 1300 B.C. have been recovered from the mouth of the Trombetas River in the Lower Amazon. The implications of this discovery are discussed. (8)

Hitchins, Patricia (British Columbia) THE BRONZE-IRON AGE OF JAPAN IN PERSPECTIVE: A COMPARISON WITH CONTEMPORANEOUS CULTURAL DEVELOPMENT IN EAST ASIA. This paper will examine the current methodological and theoretical orientations in the archaeology of the Yoyoi period, the Bronze-Iron age of Japan. The cultural development during this time period (300 B.C.-A.D. 300) will be viewed in light of contemporaneous cultural development in other areas of East Asia, particularly in terms of the acquisition of metallurgical technology. (54)

Hoffman, Michael A. (Virginia) MAN IN THE BLUE RIDGE—A MULTI-DISCIPLINARY APPROACH TO THE STUDY OF THE CULTURAL RESOURCES OF THE SHENANDOAH NATIONAL PARK. Investigations by the Laboratory of Archaeology of the University of Virginia over the last year and a half in the Shenandoah National Park have focused on the entire range of human occupation and exploitation of the Blue Ridge area. Financed by grants from the U.S. National Park Service, our research has revealed a hitherto-unsuspected wealth of prehistoric sites in the park spanning 8,000 years and has led to the discovery of the first well-stratified archaeological sites in the montane area. The prehistoric survey has been complemented by an historically-oriented survey combining the techniques of archaeology, demography, and history to investigate the early European

settlement of the Blue Ridge. Finally, an ethnohistoric program of investigation has involved extensive ethnographic and archival research and the initial analysis of the impact of isolation and later resettlement of montane communities. (6)

Hofling, Andrew (Washington) ARCHITECTURAL FEATURES AND THEIR DOMAINS IN THE LATE CLASSIC. The study of architecture is one of the oldest foci of Maya archaeology. However, recent hieroglyphic research, especially the dynastic and emblem glyph studies have surpassed the level of variational architectural analyses both in the specificity of features considered and in the explicitness of interareal relationships. The present work is a general reconsideration of areal relationships during the Late Classic period based on a formal distributional analysis of a large number of architectural features applied to representative sites of the entire Maya area. It is designed to clarify the general picture of architectural feature distribution and to specify complexes of traits shared interregionally. (11)

Holmes, Douglas (see Weigand, P. C.) (34)

Horn, Darwin D. (Washington) ANIMAL UTILIZATION IN THE LAKE TITICACA BASIN (CHIRIPA). Analysis of faunal remains from the site of Chiripa from the period of roughly 1300 B.C. to about A.D. 600 reveals new patterns of animal utilization in the altiplano. Detailed analysis of the camelid remains has allowed a systematic reconstruction of a sequential butchering model and inference on the patterns of consumption. Analysis of the small fauna has indicated that in contrast to the Ayacucho pattern, guinea pigs and other small mammals played an insignificant part in the nutritional picture. But utilization of lacustrine resources, including various avifauna as well as the more obvious fish species, is much more important than previously believed. (39)

Hoyt, Margaret A. (Wesleyan) DIAGNOSTIC FEATURES OF CHIMU INCA CERAMICS. The term "Chimu Inca" has long been used to refer to the ceramics manufactured in northern coastal and highland Peru in the time between the Inca conquest of the kingdom of Chirimor and the Spanish conquest of the area. This report, part of a stylistic seriation of Chimu ceramics, attempts to isolate those features of Chimu Inca fancy and utility wares which can serve to distinguish these ceramics from those of the preceding phase. (30)

Hurley, William M. (Toronto) EARLY JOMON (ca. 6000-3500 B.C.) VILLAGES IN HOKKAIDO AND THE ORIGINS OF SEDENTISM IN NORTHERN JAPAN. Jomon Japan has long been characterized as a cultural tradition of semipermanent camps and villages, dependent upon a hunting and gathering economy, and not fully exploiting marine resources until Middle Jomon times (ca. 4000-2500 B.C.). For Hokkaido, the Jomon presence and character were considered marginal due to severe climate conditions. Recent research in southwestern Hokkaido suggests that the roots of permanent, planned villages, horticulture, and marine exploitation between 4100 B.C.±800 can be found in this northern outpost of Jomon. Sedentary villages in Asia and the New World dating from this temporal period suggest that our view of Formative cultures needs modification. (54)

Hurtado de Mendoza, Luis (Pennsylvania State) OBSIDIAN EXPLOITATION AND SOCIAL STRUCTURE IN PRECOLUMBIAN GUATEMALA. It has been proposed that the social organization of Kaminaljuyu was causally related to patterns of production and consumption of obsidian tools. A neutron activation procedure was used to discriminate among samples of obsidian collected from different extrusions of the major obsidian sources in Guatemala. The data on extrusions were compared to debitage specimens from sites in the valley of Guatemala, where three major sociopolitical units are thought to have coexisted. Results reported here seem to validate extant hypotheses. They also facilitate inferences regarding patterns of obsidian spatial distribution and their correlation with the social organization of the region at different phases. They are examined in detail for the Late Terminal Formative (A.D. 1-200). (3)

Ikawa-Smith, Fumiko (McGill) CHOPPER/SCRAPERS, UNIFACIAL TOOLS, AND BIFACIAL FOLIATES IN PLEISTOCENE JAPAN AND THE NEW WORLD. In a recent article (*American Scientist* 64:316-327), R. S. MacNeish discussed the early prehistory of the New World in terms of four stages, and cited, as characteristic tools for the first three of the stages, the bifacial choppers and flake scrapers, specialized unifacial tools, and bifacial leaf-shaped projectile points, respectively. It is likely that the three categories of tools cited by MacNeish do belong to three separate technological traditions in Pleistocene Japan. The paper attempts to delineate spatial and temporal distributions of these traditions within Japan and in northeast Asia during the Upper Pleistocene. (54)

Irwin, H. (see Wessen, G. C.) (44)

Isaac, Glynn (see Clark, J. D.) (24)

Isbell, William H. (SUNY-Binghamton) REDISTRIBUTION ECONOMIES: GARAGAY AND THE CHAVIN SPHERE. Research on the site of Garagay and its newly discovered Chavinoid monumental ceremonial architecture provide good data for discussion of the emergence of redistributive economies and rite size hierarchies in coastal Peru. Andean archaeologists have tended to ignore the methodological, interpretive developments taking place in other research areas. An emphasis on these research tools will permit us to orient our research in more significant directions in the future. (39)

Ives, David J. (Missouri-Columbia) THE MERAMEC ARCHAEOLOGICAL PROJECT: 1976-1977. The multi-year, interdisciplinary Meramec Archaeological Project is well into its second year of research in east-central Missouri. Past and current scopes of work reflect both agency and professional needs and have required the application and evaluation of nonstandard survey techniques. Although the project is still in its initial phases, specific benefits have already been realized by the Corps of Engineers, the archaeological community, and the public. Such multiplicity of benefits must be derived from this and all such projects. (6)

Jacobsen, Thomas W. (Indiana) OBSERVATIONS ABOUT THE ORIGINS OF PLANT AND ANIMAL HUSBANDRY IN SOUTHERN GREECE. This paper will briefly discuss the present evidence related to the problem of the development of an economy based largely upon subsistence agriculture in southern Greece, with special attention given to the important new findings from Franchthi Cave in the Greek Argolid. The major question to be considered is: are the origins of agriculture in southern Greece the result of a process of diffusion from the better known areas of the Middle East, or are they the result of local experimentation that began as early as the late Pleistocene? The evidence from the Franchthi excavations promises to be of great value in deciding this issue because of the site's long stratigraphic sequence that encompasses the critical block of time from ca. 25,000 to ca. 5,000 years ago. The results will also have significant implications for our understanding of the origins of agriculture in Greece as a whole as well as in the neighboring areas of temperate Europe and the Near East. (16)

Jarrin, I. (Universidad Estatal de Guayaquil) ENGOMALA UN SITIO VALDIVIA TARDIO. Behind the Cerro de Chanduy at a bend of Zapotal River, and on its floodplain, some 15 km from the seashore, a Valdivia D (Valdivia VIII) site exists. Its fishing and agricultural economy are discussed. (9)

Jefferies, Richard W. (Georgia) INTERSITE ACTIVITY VARIABILITY AS REVEALED THROUGH TECHNOLOGICAL ANALYSIS OF LITHIC DEBITAGE. Archaeological reconnaissance of the Lookout Valley watershed in northwest Georgia has resulted in the location of 56 prehistoric sites. Lithic debitage constitutes the largest single category of artifacts recovered from these sites. The technological attributes of debitage collected are analyzed using several types of multivariate statistical techniques in an attempt to discern nonrandom patterns of variability. Hypotheses concerning variation in site activity as reflected by technological variability of debitage, physiographic variability of site location, and distance of the site from lithic resources will be examined. (3)

Jelinek, Arthur J. (Arizona) SOME USES OF DEBITAGE IN ARCHAEOLOGICAL ANALYSIS. Debitage, here defined as complete and fragmentary unretouched flakes and cores, can contribute to the interpretation of archaeological remains in several ways. Three of these are treated here in the context of a single deeply stratified Paleolithic site (et Tabun): (1) the consistent features of shape of some elements of debitage in relation to the forces contributing to the final position of the material in archaeological deposits can yield helpful information bearing on disturbance and attitude of old surfaces; (2) ratios of particular elements of debitage and debitage/tool ratios can furnish evidence of manufacture and utilization of lithic materials; (3) ratios of metric dimensions of flakes can be used to interpret major differences and trends in technological traditions. (3)

Jeter, Marvin D. (Arizona State) PREHISTORIC PROCESSES IN THE PRESCOTT REGION, WEST-CENTRAL ARIZONA. Investigations in Copper Basin, southwest of Prescott, represent the first comprehensive study of a "Prescott Branch" settlement-subsistence system. Sites include small groups of one-room structures overlooking agricultural lands, gathering-hunting loci in a variety of chaparral communities, and small hilltop enclosures. Climatic conditions ca. A.D. 900-1100 permitted a continuum of semipermanent to temporary field houses, associated with various soil situations in Copper Basin and at previously investigated sites in this agriculturally marginal region. Climatic deterioration apparently precipitated population aggregation in better agricultural situations, and may have also given rise to the essentially non-agricultural Yavapai system. (51)

Jochim, Michael A. (California-Santa Barbara) ECONOMIC STRATEGIES IN THE UPPER RHINE MESOLITHIC. A general model of economic decision-making among hunter-gatherers has been developed that can generate predictions about the distribution of archaeological materials. Application of this model to the Mesolithic of the south German Danube Valley suggested functional interrelationships among known sites. The model is now applied to the same time period of an adjacent portion of the upper Rhine which, unlike the Danube, possessed great runs of salmon in historic times. Unfortunately, Mesolithic material of this region includes no salmon remains, and the prehistoric presence of this resource cannot be assumed, due to great changes in the coastline and lower Rhine. Investigation of the Mesolithic economy is approached by constructing various forms of the model, each incorporating different assumptions regarding the presence or absence of salmon, efficiency of harvesting technology, and the practice of storage techniques. The resulting sets of predictions, differing in terms of site distribution and characteristics, are compared with the archaeological record, and suggestions are offered about the Mesolithic economy of this region. The value of such theoretical tools is stressed. (46)

Johnson, Eileen (Texas Tech) PALEO-INDIAN BONE EXPEDIENCY TOOLS—LUBBOCK LAKE AND BONFIRE SHELTER. Bone butchering tools, particularly in Paleo-Indian

localities, have only recently been recognized and described as assemblages. These butchering tools are referred to as expediency tools because they were made at the site from bones of bison carcasses being processed and then left with the rest of the faunal debris when the locality was abandoned. Bison kills at the Lubbock Lake site were small, with only a few bison killed and processed at any one time. Expediency tools have been recovered from both Folsom and Plainview bison kill/butchering locales. Bonfire Shelter is a bison mega-kill locality, with three kills spanning the Folsom and Plainview periods. Although not previously reported, several expediency tools have been recognized during a recent reanalysis of the material. Both sites are on the Southern Plains, and the assemblages from the two localities are described and compared. (13)

Johnson, Jay K. (Mississippi) TYPOLOGICAL STRUCTURE IN MAYA LITHIC ANALYSIS: A HISTORICAL PERSPECTIVE. The explicit and implicit typological decisions that underlie the major analyses of chipped stone artifacts from the southern Maya Lowlands are examined and related to their historical development. A general lack of typological objectives is noted for the majority of these reports. However, recent developments in the structuring of Maya lithic typology show promise of moving beyond description to problems of anthropological interest. (47)

Jones, Christopher (Pennsylvania) RESEARCH AT QUIRIGUA, GUATEMALA: THE SITE-CORE PROGRAM. The Quirigua Project of the University Museum (University of Pennsylvania) and the Instituto de Antropología e Historia (Guatemala) is conducting archaeological research in and around this Classic Maya site in eastern Guatemala. Investigations are focused through two basic programs, one in the site-core and the other in the site-periphery. At the end of the third season of excavation, the developmental patterns of the Acropolis area and adjacent Great (Monument) Plaza of the site-core are beginning to be apparent. These trends will be examined in connection with the hieroglyphic monuments and with various working hypotheses as to site function. (55)

Jones, Grant D. (Hamilton) THE LOCATION OF TAYASAL IN THE LIGHT OF LAKE PETEN MAYA ETHNOHISTORY. It was recently suggested (*American Antiquity* 41:154-167) that ethnohistorical and archaeological evidence favored the location of Tayasal, the principal Itza Maya settlement of the protohistoric and Colonial periods, at Topoxte in Lake Yaxha, Peten, Guatemala. This review of sixteenth and seventeenth century ethnohistorical sources concludes that Tayasal could not have been in Lake Yaxha, and that it was almost certainly on the island of Flores in Lake Peten. The locations of other Itza settlements as well as settlements of additional Itza-dominated groups in the Lake Peten region are also discussed. A tentative model of Lake Peten Maya settlement patterns is presented as part of a larger ongoing ethnohistorical study. (34)

Jones, Timothy W. (Idaho) ECONOMIC DISPARITY AT KANAKA VILLAGE. Kanaka Village was occupied by workers of the Hudson's Bay Company from 1825 to 1860 at Vancouver, Washington. This paper considers the possibility of economic disparity between housing units in the village. This question will be examined by using a methodology based on the hypothesis that some artifact clusters are reflective of the purchasing ability of each household. The relative values of some goods are taken from remaining price lists. As a test the village will be compared with the Chief Factor's House at Fort Vancouver. (42)

Judge, W. James (NPS) A PROJECT-SPECIFIC EVALUATION OF SARG RESULTS. Apart from providing a basis for tests of general propositions about human behavior, the SARG concept also necessitates investigation of the prehistory of specific regions. In this paper, the SARG effort is evaluated in regard to the insight that has been gained into the prehistory of the regions where SARG research has been undertaken and the nature of testing of SARG hypotheses that has occurred. (10)

Justeson, John S. (South Carolina) CLASSIC MAYA DYNASTIC RELATIONS. Patterns of marriage, residence, and descent among certain Classic Maya nobility are inferred from hieroglyphic inscriptions pertaining to Piedras Negras, Guatemala; the political significance of the patterns is discussed briefly. These inferences are based upon certain glyphic decipherments for which linguistic and contextual support is presented. The proposed reconstruction is discussed with reference to other suggested patterns of elite social organization. (11)

Justeson, John S. (see Fox, J. A.) (11)

Keene, Arthur S. (Michigan) ECONOMIC OPTIMIZATION MODELS AND THE STUDY OF HUNTER-GATHERER SUBSISTENCE SETTLEMENT SYSTEMS. Mathematical (linear) programming, decision theory, and a large body of ethnographic data are used to develop a model of hunter-gatherer subsistence settlement systems that can predict: (1) how decisions regarding resource acquisition and settlement location will be formulated within a synchronic context; (2) how the subsistence strategy will change through time in response to specific perturbations to the natural and human ecosystems; and (3) how these patterns will be manifest in the archaeological record. Examples are provided using ethnographic data from the central Canadian Arctic, and an archaeological test case is proposed. (46)

Kehoe, Alice B. (see Kehoe, T. F.) (32)

Kehoe, Thomas F. (Milwaukee Public Museum) THE "DIRECT ETHNOLOGICAL" APPROACH, ETHNOARCHAEOLOGY, AND ETHNOHISTORY IN EASTERN ANGLO-AMERICA. A "direct ethnological" approach to an archaeological problem was developed by T. F. Kehoe, working in Blackfoot territory, during the 1950s. The authors' most recent use of this method of investigation was in 1975-76, again in the northwestern Plains. For this symposium, we describe the "direct ethnological" method, comparing it to ethnoarchaeology, as used by Bonnichsen, and to ethnohistorical investigations. The potential use of the "direct ethnological" method, as well as of ethnoarchaeology narrowly defined, in the eastern half of Anglo-America will be suggested, and caveats mentioned. (32)

Keller, Don (Museum of Northern Arizona) THE TOLCHACO COMPLEX IN THE LIGHT OF DEBITAGE ANALYSIS. Analysis of lithic material from extensive Pleistocene gravel-terrace quarry sites in northeastern Arizona has provided a basis for describing certain aspects of lithic procurement and use. The study is based on a comparison of expected versus observed frequencies of various artifact classes. Expected frequency values were obtained through replicative experiments. Data generated by this study are further applied toward a redefinition of the so-called Tolchaco complex. The hypothesis is advanced that this complex represents limited function, including quarry/workshop activity, rather than remains of an archaeological culture. (3)

Kennedy, Nedenia C. (Illinois-Urbana) ON THE FRONTIER AT PLAYA DE LOS MUERTOS, HONDURAS. Previous appraisals of Formative period occupations at Playa de los Muertos, Honduras, have dwelt upon the more "exotic" ceramics found there; and their similarity to Formative wares from such sites as Tlatilco and Tlapacoya in Central Mexico. New investigations reveal, however, that the artifactual complex of Playa de los Muertos in its entirety is more significantly related to Formative period complexes within southern Mesoamerica and Central America. In this presentation I shall review several lines of evidence to this effect and discuss their implications as regards long-distance contacts, definition of a southern periphery, and the rise of civilization in Mesoamerica. (36)

Kennedy, W. J. (Florida Atlantic) ARCHAEOLOGICAL INVESTIGATION AT TORITO, AN EARLY PERIOD SITE IN THE REVENTAZON RIVER VALLEY, COSTA RICA. Analysis of data recovered from the Torito site during the past field season and previous years will be considered. Focus will be on the significance and implications of this Early period site and its relationship to the recently defined El Bosque complex of the Atlantic watershed region. (28)

King, Mary Elizabeth (see Gardner, J.) (17)

Klein, Joel I. (NYS Office of Parks and Recreation) THE SHPO, FEDERAL AGENCIES, AND THE CONTRACT ARCHAEOLOGIST: A CAUTIOUS MENAGE. To date, only a handful of federal agencies have established regulations regarding the identification of cultural resources. This has placed the various State Historic Preservation Officers, whose role is strictly defined as advisory and consultative, in the often uncomfortable position of (a) reminding federal agencies of their responsibilities toward historic and archaeological sites, and (b) often acting as staff archaeologist for these same agencies. In New York State, the result has been the adoption of a procedure by the NYSHPO and Region II of the Environmental Protection Agency, which is designed to ensure proper historic preservation compliance. This paper will use case studies to review the basics of this procedure and show how it has affected archaeologists engaged in cultural resource studies for Pure Waters projects in New York. (26)

Kleiner, Sally Jane (Eastern New Mexico) ORNAMENTS AT SALMON RUINS, SAN JUAN COUNTY, NEW MEXICO. The ornaments at Salmon Ruins are a population of artifacts that are considered to have functioned outside the life support system of the pueblo. The assumption is made that the function they served was aesthetic, social, and/or ritual. Objects included in this study are: (1) items of adornment and decoration; (2) coloring stones and pigment; (3) non-indigenous materials; and (4) effigies, small statuary, and carvings. Tools used to manufacture ornaments and produce pigments are also considered. The research design established to study ornaments has several objectives: (I) the identification of materials used to manufacture ornaments and possible sources of these materials; (II) the classification of ornaments by categories based on morphology and inferred use or function; (III) the distribution of ornaments within the pueblo; and (IV) comparison of ornaments from Salmon with those from other contemporaneously occupied pueblos. (41)

Klesert, Tony (SIU-Carbondale) ANALYSIS OF INTRASITE CERAMIC DESIGN VARIABILITY. A quantitative method of describing ceramics, based upon painted design attributes, is devised and applied to the analysis of temporal variability. In the test case, the ceramics are the population of sherds from a single Pueblo I Anasazi site on Black Mesa, northeastern Arizona. The site is highly heterogeneous architecturally and temporally; but the ceramics, using traditional typology, are entirely homogeneous. The design attributes are manipulated by discriminant analysis, and while the heterogeneity between groups is small, it coincides in all cases with previously known temporal heterogeneity within the site, based upon known construction and abandonment sequences and tree-ring dates. (40)

Knab, Tim (SUNY-Albany) METAPHORS AND MEANINGS IN CLASSIC AZTEC. This paper will first review documentary sources that form the basis for our understanding of

classic Aztec metaphors. Sahagun's compilation, as well as lesser known collections of metaphors by major grammarians and other authors of the sixteenth century, will be reviewed. A thorough compilation and correlation of these sources along with a textual critique must form the basis for analysis. Metaphors themselves bear only a clumsy semblance of their intended meaning; the phenomenon of metaphor must be treated within the frame of performance, genre, speech event. The affinity of classic Aztec rhetorical, poetic, and narrative forms for complex multileveled metaphors has considerable importance, theoretically and practically, for ethnohistorical interpretation. Texts must be interpreted in terms of context as well as content in order to ascertain intended meaning. Each major class of metaphor will be discussed with contextual examples. The use of metaphor in classic Aztec speech can yield important ethnographic insights with real meaning. (38)

Kohl, Philip L. (Wellesley) THE BALANCE OF TRADE IN SOUTHWEST ASIA IN THE MID-THIRD MILLENNIUM: A STRUCTURAL ANALYSIS. Most analyses of long-distance exchange in early States emphasize the way this trade reinforced incipient class stratification in these societies; luxury goods obtained by the elite distinguished them from the rest of society. Such functional interpretations present an incomplete, if not superficial, explanation for the way such trading networks originated, how they were integrated into the productive economies of each participating society, and, ultimately, what structural contradictions led to the decline of these wide-ranging interactions. Material documenting long-distance trade in luxury goods in Southwest Asia in the mid-third millennium will be presented. This exchange system will be analyzed from a perspective showing that the structure of production of goods for exchange or creation of exchange values in each participant society is essential to understanding the trading system's "function." A dynamic analysis of the development and breakdown of exchange systems necessitates consideration of the motivational factors and unequal relations that emerge among participant societies. (46)

Kohler, Tim A. (Florida) THE MCKEITHEN SITE: PRELIMINARY REPORT. Carbon samples from sampling excavations at the McKeithen site, a large Weeden Island ceremonial center in north Florida, yielded early dates which may somewhat alter our views of the chronology and development of north Florida and southwest Georgia Weeden Islandism. Presentation of the dates and their contexts and the preliminary analysis of a stratified random sampling program conducted in the summer of 1976 will precede a brief discussion of hypotheses generated from the sample and their proposed methods of testing. (53)

Kolb, Charles C. (Pennsylvania State) THE ERIEZ INDIANS: AN ARCHAEOLOGICAL AND ETHNOHISTORICAL REEVALUATION. The Eriez, a prehistoric and protohistoric tribal society culturally related to Iroquois-speaking groups, occupied the southern Lake Erie shoreline of northwestern New York, northernmost Pennsylvania, and northeastern Ohio prior to their political extermination by the League of the Ho-de-no-sau-nee in about 1654. Few explorers visited Eriez villages, and none left accurate reports to permit the determination of settlement locations. The Jesuit Relations provide scanty clues, hence most information comes from unsystematic excavations beginning in 1906 that intensified during WPA times. This report draws together early and post-1950 investigations in the tri-state area and summarizes current research and cultural interpretations. (42)

Kukan, Gerald (Toronto) TECHNOLOGICAL VARIABILITY AND CHANGE IN THE LEVANTINE EPIPALEOLITHIC. The proposition is advanced that microlith formal variation can be explained on the basis of variable structural design of microliths corresponding to different hafting modes. Hafting models are presented together with theory and concepts that specify how microliths were manufactured to facilitate hafting. Hafting is regarded as a technological process and composite tools (not microliths) are viewed as technological end-products. Microlith design and hafting techniques are perceived to have become increasingly efficient during the Epipaleolithic. This aspect of technological progress is manifested in design innovations pertaining to the miniaturization and standardization of microlith components, the improvement of contacting hafted surfaces, and the longevity of composite tools. (33)

Kurbjuhn, Kornelia (Tubingen) A COMPARISON OF PLANETS IN THE CODICES LAUD, FEJERVARY-MAYER, AND BORGIA. Codex Laud, 8-3, Codex Fejervary-Mayer, pages 30-40, and Codex Borgia, 55, described and explained Sun, Moon, and the Planets to ancient American priests. Those sections have been studied individually by E. Seler, K. Novotny, and T. Barthel but were never systematically correlated and studied as one body of data. By doing so it is possible to order astronomical information into a model of the universe and to illuminate character, action, and place of heavenly bodies as seen by early American scientists. Objects and beliefs are traced in other Mesoamerican cultures in an effort to determine the geographical spread of influence ascribed to the priestly school which produced the manuscripts. (48)

Kurjack, Edward B. (see Garza, S.) (31)

Kurjack, Edward B. (see Allen, R.K.) (31)

Kus, James S. (California State-Fresno) CHIMU IRRIGATED AGRICULTURE. Recent (1976) archaeological investigation of Prehispanic irrigated agriculture in northern coastal

Peru is discussed in terms of the history and development of this practice during the Moche and Chimú dominations of North Coast cultural events. Theoretical models of irrigated agriculture in the formation of political states are discussed in the light of the results of current research in the Moche Valley and surrounding area. (49)

Kuttruff, Carl (Vanderbilt) THE MOUND BOTTOM AND BROWN PACK SITES, TENNESSEE. This paper describes the Mound Bottom and Brown Pack sites, large adjacent Mississippian civic-ceremonial centers in the Harpeth River Valley near Nashville, Tennessee. The Mound Bottom site consists of ten mounds arranged around a plaza and surrounding habitation areas covering an area of nearly 100 acres. The Brown Pack site, which is at least partially contemporary, is of comparable size and configuration. A summary of the work that has been carried out at these sites since 1936 is presented; the dating of the Mound Bottom site, ca. A.D. 900-1350, and its relationship to other large Mississippian centers is also discussed. (53)

Lambert, P. W. (INAH) LATE QUATERNARY (POST-15,000 B.P.) VOLCANIC ACTIVITY OF POPOCATEPETL VOLCANO, MEXICO. Seven air-fall tephras identified on the northwest side of Popocatepetl Volcano may eventually be found in Paleo-Indian to Classic period archaeological sites in the Basin of Mexico and Puebla Valley. In ascending order the tephras include gray ash and pumice lapilli ( $14,889 \pm 130$  radiocarbon years, soil humus date), yellow pumice lapilli (slightly younger than  $14,889 \pm 130$  B.P.), pumice lapilli with large blocks (between  $10,740 \pm 80$  and  $14,889 \pm 130$  B.P.), yellow pumice lapilli ( $5081 \pm 45$  B.P.), varicolored ash ( $1626 \pm 24$  B.P.), and black ash (between  $1626 \pm 24$  and 123 B.P.). Seale (1973) has described prehistoric milpas buried by Popocatepetl pumice near Cholula. The volcano has continued to be active during the Postclassic and Historic periods. (4)

Lange, Frederick W. (Museo Nacional de Costa Rica) EXCAVATIONS AT THE VIDOR SITE, GUANACASTE, COSTA RICA. Three seasons of excavation at the Vidor site have focused on intensive studies of various aspects of a large Pacific coastal shell midden site. Intrisite differences are noted, a restructuring of part of the regional ceramic sequence is presented, and a detailed picture of subsistence practices is given. (28)

Langenwalter, Paul E. (see Powell, S.) (1)

Large, Elinor G. (Arizona State) COMPARISON OF MODERN AND PREHISTORIC SETTLEMENT PATTERNS IN THE LOWER PAPALOAPAN BASIN, VERACRUZ, MEXICO. Photointerpretation and field survey suggest that the linear patterning of houses in modern hamlets in the lower Papaloapan Basin, Veracruz, Mexico, resembles that of small archaeological sites in the area. Measures of spatial patterning are used to analyze this resemblance. (23)

Larson, Paul (SMU) NATUFIAN ADAPTIVE STRATEGIES IN THE CENTRAL NEGEV, ISRAEL. Rosh Horesha is one of the largest Natufian sites known. Its location within the comparatively dry, high Central Negev suggests an adaptive model that differs from sites in northern Palestine. Recent test excavations seem to indicate that the huge size and high artifact density of Rosh Horesha are the result of either true sedentism or long periods of semipermanent occupation and cannot be explained by seasonal hunting camps. (33)

Lathrap, Donald W. (Illinois-Urbana) ICONOGRAPHIC UNITY BETWEEN MESO-AMERICA AND SOUTH AMERICA. A structural identity between Chavin iconography and Olmec iconography has been demonstrated. This identity suggests derivation of both styles from an earlier culture, in northern South America. The implications of this derivation for the early development and spread of efficient agriculture are discussed. (21)

Lavine-Lischka, Leslie (Colorado State) DEBITAGE AS THE KEY FACTOR TO BEHAVIORAL PATTERNS ON A LITHIC SITE. The entire assemblage of lithic debitage from a "quarry" site in the Pawnee National Grasslands has been analyzed. The information obtained shows that the hilltop was chosen so that one could watch during the day for game while preparing tools related to hunting activities. Absence of hearths, structures, and certain tool types suggests that the site was neither permanent nor used for camping. (3)

Layhe, Robert (SIU-Carbondale) A MULTIVARIATE APPROACH TO POPULATION ESTIMATES AND CHANGE, BLACK MESA, NORTHEASTERN ARIZONA. This research report will focus on the problem of population changes and estimates through time on Black Mesa, Northeastern Arizona. One previous model has been constructed addressing this problem. There are, however, a number of problems inherent in this first approach. Some improvements are suggested. The report will also focus on a number of variables: amount of floor space, site area, and artifact density. The latter two will be used to project estimates on the former via a multiple regression analysis. From floor area, models of population size will be constructed to test the original population curve established for Black Mesa. (51)

LeBlanc, Catherine (UCLA) DESIGN ANALYSIS OF MIMBRES POTTERY. An initial study of Mimbres pottery designs is described. Variability in motif distribution within the Mimbres area is considered from studying complete bowls of known provenience. Several models are proposed to account for the observed distributions of motifs within the area. (1)

LeBlanc, Steven A. (Mimbres Foundation) OVERVIEW AND RESEARCH DESIGN OF THE MIMBRES FOUNDATION'S WORK IN SOUTHWESTERN NEW MEXICO. In an overview of the Mimbres Foundation's work in the Mimbres Valley, the research design in an area that has seen terrible pothunting, and how excavation strategies have been formulated to overcome the difficulties of badly disturbed sites, will be discussed. A brief summary of the culture history is given. (1)

Lenihan, Daniel J. (NPS) THE NATIONAL RESERVOIR INUNDATION STUDY. Reservoir salvage contracts have played a major role in shaping the development of archaeology in the United States. Decisions as to whether or not a particular site should be salvaged, left untouched, or physically protected are usually made without the benefit of any real understanding of the nature and extent of the impact of fresh water immersion on archaeological values. Data derived from the inundation study will provide a baseline for assessing these impacts and, when used in association with an adequate regional archaeological overview will enable the implementation of a true conservation approach in the managing of cultural resources in reservoirs. Knowing the differential effect of inundation on various archaeological data retrieval techniques will also permit archaeologists on a site specific basis to direct their research design toward salvaging categories of data which will be the most threatened by immersion. The study is being conducted by the National Park Service through a cooperative funding agreement with the Bureau of Reclamation, U.S. Army Corps of Engineers, and the Soil Conservation Service. (26)

Levine, Frances (NPS) NOMADIC PASTORALISM ON THE PECOS RIVER DURING THE MEXICAN AND TERRITORIAL PERIODS. Spanish-American settlement of the eastern New Mexican grasslands bordering the Pecos River was late in the overall growth of European settlement in the Southwest. In part, the settlement was tied to the rise of commercial sheep ranching in the nineteenth century. Ethnoarchaeological data from a survey of the Los Esteros Reservoir have been utilized to focus on the settlement pattern resulting from commercial pastoralism in northeastern New Mexico. (27)

Lewarch, Dennis E. (Washington) SPATIAL-FUNCTIONAL STRUCTURE OF THE LATE POSTCLASSIC SETTLEMENT SYSTEM IN THE COATLÁN DEL RÍO VALLEY, WESTERN MORELOS, MEXICO. Intensive surface collection techniques were applied to Late Postclassic sites in the Coatlán del Río Valley as part of the Proyecto Coatlán, INAH, Morelos-Guerrero. Preliminary results suggest: (1) a highly aggregated settlement pattern; (2) a restricted range of site types; (3) structural-functional units comprising internal site structure to be common throughout the region; and (4) complex relationships between site function and variables such as site location or site size. Based on the Coatlán data, utility of various geographic models of location is assessed. (34)

Lightfoot, Kent (see Hantman, J.) (40)

Liman, Florence IDENTIFICATION OF EMBLEM GLYPHS AND THE PROVENIENCE OF AN UNUSUAL STELA. Additions to H. Berlin's original list of emblem glyphs have been made at known sites by identifying recurrent glyphs that meet his criteria of a main sign with aquatic and Ben Ich (Ahpo, Ahpop, Ahau) prefixes. The stela to be discussed here has two such emblem glyphs but its place of origin is not known. Comparatively few Maya inscriptions include emblem glyphs, and the incidence of two in one text is even lower especially on a stela containing only 16 glyph blocks with Initial Series inscription. This paper will present evidence to provide an identification of the emblems on the stela and thus establish its provenience. (11)

Limp, W. Frederick (Indiana) THE ECONOMICS OF AGRICULTURAL DISPERSION. Archaeological theory concerning problems of technological change, particularly regarding origins and dispersion of agriculture, have generally emphasized exogenous forces: population "pressure," environmental change, genetic mutation, etc. Economic theory, in contrast, examines the interplay between the exogenous parameters of a system and the internal endogenous variable, giving a primary role to such things as variable cost functions of different production techniques. Use of an economic model demonstrates that the conventional use of population "pressure" or environmental change cannot be operating in dispersion of agriculture from its center(s) of origin. Instead, local characteristics of such endogenous factors as relative production costs, risk aversion, and presence of markets are shown to be the critical variables. It is proposed that in circumstances of technological change, such as those associated with the dispersion of agriculture, the algorithmic nature of economic analysis is more compatible with the requirements of effective hypothesis testing and predictive modeling than the loosely structured verbal approach most frequently used in archaeological research. (46)

Lindsay, Alexander J., Jr. (Museum of Northern Arizona) CULTURAL RESOURCE MANAGEMENT AS A BUSINESS, AND ITS PLACE IN THE BUSINESS WORLD. Cultural resource management is becoming an integral part of any major construction activity. The entry of this new component into construction programs has caused problems for construction planners. The rapid growth of the cultural resource management field and its entry into the sphere of big business has also caused problems for managers of cultural resource management programs. A mutual education program conducted by simple

communications between parties is needed to alleviate the growing pains of our field. Suggestions for such communications are given. (26)

Litvak King, Jaime (UNAM) HOMOTAXIALITY AND CHRONOLOGY IN MESO-AMERICAN ARCHAEOLOGY. Chronology in Mesoamerican sequences has traditionally been applied as homotaxiality. A systemic model for Mesoamerican development shows that heterotaxial situations at any given point in the sequence are the norm and show a consistent pattern that can be analyzed both as to intraregional relations and as to developmental constants through time for any given location. (2)

Longacre, William A. (Arizona) KALINGA POTTERY MAKING. Archaeologists are showing increased and ever more sophisticated concern about the relationships between variability in material culture and the behavior and organization of peoples. To explore the linkage between stylistic variability in pottery and various aspects of behavior, 12 months of fieldwork were conducted among the Kalinga of northern Luzon, Philippines. Learning frameworks, kinship, residence patterns, and informal work groups were studied and an intensive analysis of pottery undertaken. The results of this study are reported together with a discussion of the native system of classification, patterns of pottery breakage and disposal, and other processes creating the archaeological record. (24)

Loose, Ann A. (Bureau of Land Management) THE BUREAU OF LAND MANAGEMENT, CULTURAL RESOURCES, AND CONTRACTING. The paper describes the BLM cultural resource contracting program including the recent switch from sole source to negotiated procurement. Emphasis will be on: (1) BLM cultural resource inventory as it relates to management needs; (2) contracts not grants; and (3) the relationship between BLM and the archaeological profession. This will involve a frank discussion of the problems that led to the cultural resource inventory contracting effort (involving 16 requirements contracts for the 12 western states including Alaska). The benefits and drawbacks of this method of contracting for cultural resource inventory will be included. (43)

Lord, Kenneth (Texas-Austin) PRELIMINARY VERTEBRATE FAUNAL RESEARCH AT HINDS CAVE, TEXAS, 41VV456. The preliminary identification of vertebrate remains from Hinds Cave suggests a great diversity of mammals, fish, and reptiles. These remains can be very useful in establishing ecological information as to species present in the Hinds Cave area in the time scale of the cave's occupation. The remains also give insight as to the food resources used by the aboriginal population. These food bones can yield information on food preference, amounts of meat available to the population, and ideas of butchering techniques. (35)

Lowe, Gareth W. (Brigham Young) EARLIEST FORMATIVE OF MESOAMERICA AND POSSIBLE ANTECEDENTS. A review of the earliest ceramic horizons in Mesoamerica suggests a pattern of several relatively independent cultural traditions established certainly before 1500 B.C. and some apparently well before 2000 B.C. The distinguishing characteristics for the earliest identified phases of each of these traditions are examined and an attempt made to establish the presence or absence of possible donor sources in South America. (21)

Luce, Harvey (see Stinson, W. R.) (6)

Lundberg, Emily (Illinois-Urbana) REAPPRAISAL OF VALDIVIA FIGURINES, BASED ON CONTROLLED FEATURE CONTEXTS. Abyliotic analysis of figurines recovered in excavations at Real Alto, Ecuador, reveals complex trends through time and interchange between clay and stone mediums. Wide variation in style within individual house floors indicates the absence of unilinear development of stylistic types. A model of multilinear trait evolution based on the Real Alto sample is presented. Analysis also reveals nonrandom patterning of figurine distribution on house floors. (9)

Luton, Robert M. (Michigan) A METHOD FOR TESTING THE SIGNIFICANCE OF AGGREGATION AND ASSOCIATION IN ARCHAEOLOGICAL GRID CELL COUNT ARRANGEMENTS. In the past, probability-based analyses of archaeological grid cell count data have been restricted to examinations of cell count frequency distributions and analyses of cell count variance. The spatial arrangement of cell count values has been amenable only to intuitive and non-probability-based assessment. A method is presented for establishing significance levels for both univariate and multivariate spatial aggregation in grid cell count values, based on the expected frequency distribution of variate differences between neighboring cells (or within cells, for the multivariate case). The mathematical basis of the method is briefly summarized and referenced. Extension of the method to the delineation of indicated spatial clusters is suggested. (29)

Lynott, Mark J. (SMU) TOWARD A REGIONAL RESEARCH DESIGN FOR NORTH-CENTRAL TEXAS. Previous archaeology in Texas has taken a site-specific or a reservoir-specific approach to problem-oriented research. It is argued that a regional research design will benefit archaeological research. The question of the nature of the prehistoric adaptation to the Prairie and Cross Timbers of north-central Texas is examined, and a model to explain the adaptive response of the prehistoric inhabitants of the region is presented. (19)

Mackey, Carol J. (California State-Northridge) LLAMA HERDING IN THE CHIMU STATE. The llama is usually considered as a strictly highland animal. However, excavations in the ciudadelas of Chan Chan have shown that camelid bones are regularly associated in great numbers with the highest status burials. Research into extra-urban Chimú sites has revealed camelid herding stations, and on this basis hypotheses are put forth concerning the position of llama and alpaca herding in the Chimú state. The utilization of the llama by the Chimú is then compared with uses of camelids by the preceding Moche culture and by the succeeding conquering Inca state. (39)

Madsen, David B. (State Archaeologist, Utah) POLLEN ANALYSIS AT AGRICULTURAL VILLAGE SITES: A TEST CASE AT BACKHOE VILLAGE. Pollen sampling at a Fremont site in Utah was undertaken to help interpret subsistence economy, artifact utilization, and activity loci. Samples were taken from natural and cultural strata, metates, ceramic vessels, refuse pits, structure firebasins, subfloor pits, and from 50 cm interval grids on structure floors. In spite of minimal preservation, the extensive sampling substantially altered hypotheses bases on macrofossil analysis and other data: (1) non-domestic plants, particularly cattails, chenopods, and sunflowers, were a primary, if not dominant, resource; (2) differential use of various metate and vessel forms was not evident; (3) food preparation occurred at both exterior use areas and interior firebasins; and (4) significant differences occur among similar architectural features. (51)

Magnus, Richard W. (Banco Central de Nicaragua) THE SITEIA COMPLEX: ITS IMPLICATIONS FOR THE LATE FORMATIVE OF LOWER CENTRAL AMERICA. A painted pottery complex has been established in eastern Nicaragua which seems to be related to phases to the south, west, and north. To the south, it ties in with the Cano del Oso complex of the llanos of Venezuela. There are possible connections northward with Playa de los Muertos. Finally, to the west, it is similar to newly excavated material in the Nueva Guinea zone of Nicaragua as well as Chontales, Nicaragua. It even shows some important modes in common with the Zoned Bichrome phase of Greater Nicoya. The implication is that all of Lower Central America was more closely unified during the Late Formative than during later periods. Furthermore, it seems possible that during this time span, the Intermediate Area may have contributed significantly to the cultural development of Mesoamerica. (28)

Mahula, Royce (see Gunn, J. D.) (29)

Marcos, Jorge (Illinois-Urbana) IS VALDIVIA REALLY THE EARLY FORMATIVE OF ECUADOR? Based on the results of recent excavations at the Valdivia site of Real Alto (Chanduy, Ecuador), the nature of Valdivia society is reexamined in terms of its sociocultural complexity through time. Valdivia Phases I and III (3400-3300 B.C.) conform to the notion of the Mesoamerican Early Formative village, while the settlement pattern achieved by Valdivia III (3100 B.C.) is typically that of a Mesoamerican Middle Formative community. This process continued so that by Late Valdivia (2500 B.C.) and Early Machalilla (2300 B.C.) satellite farming communities emerged around the ceremonial center of Real Alto. (9)

Marcotte, James R. (see Morris, E. A.) (19)

Marks, Anthony E. (SMU) A MIDDLE TO UPPER PALEOLITHIC TRANSITION TO THE SOUTHERN LEVANT. Recent work in the Central Negev, Israel, has uncovered a clear transition from a Levallois-based technology to one based upon true blade production. This transition, seen at site Boker Tachtit, began some time before 43,000 B.C. and terminated before ca. 37,000 B.C., by which time a fully developed Upper Paleolithic technology was present. This transition differs from that seen in the Lebanon, indicating developmental pluralism. It is suggested that the southern Levantine transition is associated with a shift in adaptive patterns, including increased mobility, and was partially in response to local climatic deterioration. (33)

Marquardt, William H. (Missouri-Columbia) FUNDAMENTALLY RANDOM CATER-PILLARS: THE INFLUENCES OF STATISTICAL ECOLOGY ON ARCHAEOLOGICAL DESCRIPTIONS OF SETTLEMENT. Implications of our utilization for spatial analysis of concepts from statistical ecology are discussed. Bounding cultural systems for purposes of generalization, or even for adequate description, presents a problem for anthropologists because the boundaries themselves are subject matter for anthropological examination. More dynamic, if less precise methods of systemic spatial description are needed. (52)

Mastache, Alba Guadalupe (see Cobean, R. H.) (2)

Matheny, Ray T. (Brigham Young) DETECTION AND MAPPING OF ANCIENT WATER CONTROLS IN THE MAYA LOWLANDS BY AERIAL PHOTOGRAPHY. Black and white aerographic, black and white infrared, color infrared, and color films each have specific applications in detecting archaeological water features in the Maya lowlands. Color infrared film yields more information about open water distribution, water-soaked areas, and vegetal differentiation than other films. Infrared films must be taken during the rainy season, but because of low cloud cover, photography is difficult. Black and white films are particularly useful for tone-line-drop out techniques which isolate only those visual features required for study. (23)

Matson, Frederick R. (Pennsylvania State) ETHNOARCHAEOLOGY OF NOMADIC AND VILLAGE POTTERYMAKING GROUPS IN THE NEAR EAST. Discussion will center on nomadic potterymaking groups of Afghanistan, such as the Kuche, as well as other better known potterymaking village groups of the Near East, in general. (24)

Mayer, Susan N. (NYU) NIANTIC-EUROPEAN CONTACT AT FORT NINIGRET, RHODE ISLAND. Fort Ninigret is a contact-period site located in Charlestown, Rhode Island. Data from well controlled test excavations undertaken in 1976 are being analyzed in conjunction with previously excavated material to provide an understanding of a part of the settlement system of the Niantic occupants of the site and their relationships with Europeans. The principal occupation of the site appears to have been in the seventeenth century after contact with Europeans had been made. Preliminary analysis of the material indicates that the site functioned in the spring and summer as a fortified stronghold and was not intensively occupied. (42)

Mayer-Oakes, William J. (Texas Tech) PROBLEMS OF EARLY MAN CHRONOLOGY IN THE NORTHERN ANDES. In the upper Guayllabamba basin of northern Highland Ecuador, two major early phases of human occupation can be defined—San Jose and El Inga. Radiocarbon, obsidian, and typological dating techniques have provided conflicting conclusions about the temporal and cultural relationships of these phases. Results of recent radiocarbon dates from the San Jose type site are presented in terms of the four-stage framework recently proposed by MacNeish for New World early man. (30)

Mayer-Oakes, William J. (see Thoms, A.) (26)

McAllister, Martin E. (USDA Forest Service) PCRMCPA: PUBLIC CULTURAL RESOURCE MANAGEMENT (CONSERVATION, PRESERVATION, AND SALVAGE) ARCHAEOLOGY. Confusion exists regarding the definitions and conceptual interrelationship of certain terms which see frequent usage in the type of archaeology now most commonly referred to as "cultural resource management." The basic concepts or principles from which these terms derive are considered. Existing definitions are reviewed and some modifications are suggested. On this basis, a new conceptual framework for the interrelationship of these terms is suggested. (26)

McAllister, S. L. (Arizona State) ARTIFACT INVENTORIES AS A PREDICTOR OF SEDENTISM ON BLACK MESA. Site size has been traditionally used in the American Southwest as a major criterion for determining seasonality, and inferentially the function of archaeological sites. If large and small sites coexist contemporaneously in an area, the large sites are inferred to be permanent habitation sites; the small sites are assumed to be seasonal outliers of the large sites. This assumption implies variation in the artifact inventories, features, ecological setting, etc. of sites of varying sizes. This implied variation will be tested using One-way analysis of variance with site size as the independent variable. The Duncan procedure, based on pairwise t-tests of the different site size categories will also be used to determine the source of the variance. The data base will include approximately 20 sites excavated by the Black Mesa Archaeological Project on Black Mesa, northern Arizona. (51)

McBride, Kevin (Connecticut) PRELIMINARY REPORT ON THE FLORAL REMAINS OF WOODCHUCK KNOLL. Woodchuck Knoll is a two-component site of the Late Archaic stage, located on the Connecticut River floodplain, 600 meters east of the river's present channel in the town of South Windsor, Connecticut. Froth flotation was used to extract the organic remains of eight hearths. Recovery of Amaranthus seeds and a granary weevil suggest that the inhabitants of this site were utilizing plant species in a manner similar to Late Archaic peoples in the Midwest riverine areas. This pattern has been previously identified in the Midwest as the "eastern agricultural complex." (6)

McCartney, Allen P. (Arkansas) A THULE COBBLE INDUSTRY FROM SOMERSET ISLAND, N.W.T. A previously unreported cobble industry of Thule affiliation was recovered during the summer of 1976 on Somerset Island, N.W.T. The Somerset field party, representing the Thule Archaeology Conservation Project (Archaeological Survey of Canada and the Department of Indian and Northern Affairs), excavated six Thule houses at two sites. Basalt cobbles of regional origin were utilized as hammerstones as well as cores for the production of large flakes and core tools with pointed tips. These unhafted cobble tools show wear polish only on the working tips. They possibly functioned as tools to split whale bones or to chop ice or frozen meat. (14)

McCoy, Patrick C. (Bishop Museum) ARCHAEOLOGICAL INVESTIGATIONS AT THE MAUNA KEA ADZ QUARRY COMPLEX, HAWAII: PRELIMINARY RESULTS OF THE 1975-76 FIELDWORK. Results of fieldwork conducted in the summers of 1975-76 at the Mauna Kea Adz Quarry Complex are described in relation to a set of primary objectives aimed at developing a technological model of Hawaiian adz manufacture. Distributed over an area of roughly 7 1/2 square miles between the 8,600 and 12,400 ft elevation on the south slope of Mauna Kea, the quarry is the largest known adz-making locality in Polynesia. Brief interpretive remarks are made on the following: geological relationships and general exploitation patterns, variety and associations of activity loci, complexity of workshops, manufacturing techniques, behavioral aspects of manufacture, variability in adz preform types, living arrangements, climatic change, and chronology of quarry use. (14)

McEwan, Gordon F. (Texas A&M) VALDIVIA, JOMON FISHERMEN, AND THE NATURE OF THE NORTH PACIFIC: SOME NAUTICAL PROBLEMS WITH MEGGERS, EVANS, AND ESTRADA'S (1965) TRANS-OCEANIC CONTACT THESIS. Meggers, Evans, and Estrada's (1965) thesis, that storm-tossed Jomon fishermen drifted across the north Pacific to the coast of Ecuador and introduced pottery-making at the Valdivia site, is presented. The thesis is examined from the standpoint of the mechanics of such a voyage. The nature of the surface current patterns in the north Pacific are discussed together with the weather conditions found along the presumed route, the types of vessels known archaeologically for the early Jomon, and the suitability of such vessels for a trans-Pacific crossing. Finally, the survival problems faced by a crew adrift in an open boat on the north Pacific are presented. It is concluded that contact between Jomon and Valdivian peoples was unlikely to have occurred in the manner suggested by Meggers, Evans, and Estrada. (30)

McKerrell, Hugh (see Neely, J. A.) (41)

McLaughlin, Diane E. (Arizona) THE POTENTIAL OF ARTIFACTUAL POLLEN WASHES FOR RECOVERING ENVIRONMENTAL AND SUBSISTENCE DATA. Since the mid-1960s the acquisition of environmental data has increasingly become a standard procedure in the excavation of archaeological sites. Pollen sampling is one important source of this data. Although the technique of taking pollen washes from ground stone and ceramic artifacts is not new, there is very little comparative data available in the literature. This paper presents techniques for sampling the artifactual material in the field and suggestions for information that will aid the pollen analyst. Some of the potential for recovering environmental and subsistence data is illustrated through a comparison of sites from three subareas of the southwestern United States—Baca Float (Hohokam), Grasshopper (Mogollon), and Black Mesa (Anasazi). (5)

McLaughlin, Diane E. (see Van Devender, T. R.) (27)

McPherron, Alan (Pittsburgh) CHANGES IN SETTLEMENT AND SUBSISTENCE BETWEEN EARLY AND LATE NEOLITHIC IN YUGOSLAVIA. Evidence from Starcevo-Koros sites suggests repeated short-term occupations, with small, relatively mobile, often dispersed communities emphasizing sheep-herding, possibly transhumant. By contrast, Vinca sites show a sedentary pattern, with nucleated villages, increase in population density, warfare or raiding, and greater importance of cattle and crops. Hypotheses to explain the differences and the shift from the one to the other pattern are presented. (16)

Miksicek, Charles H. (Arizona) THE PREHISTORIC SUBSISTENCE ECOLOGY OF THE EL MORRO VALLEY, NEW MEXICO. The analysis of archaeobotanical remains from the test excavation of sites in the El Morro Valley in west-central New Mexico yielded information about the adaptation of a prehistoric human population to environmental stress in the late thirteenth century A.D. Three assemblages of cultivated and collected plant foods are recognizable from the flotation record. Changes in these complexes are correlated with increasingly xeric conditions as indicated by tree-ring indices and with a shift in settlement pattern from small dispersed sites to large defensive sites. (41)

Miksicek, Charles (see McLaughlin, D.) (5)

Miller, Susanne J. (Idaho State) TAPHONOMY OF EXTINCT MEGAFAUNA ACCOMPANYING A FLUTED POINT TRADITION AT OWL CAVE, THE WASDEN SITE, IDAHO. Focus of the 1975-76 seasons at Owl Cave, the Wasden Site, northeastern Snake River plain, Idaho, has been on the archaeology, paleontology, geology, and sedimentology of the earliest cultural layers, including a bison kill and butchering deposit at ca. 8000 B.P. accompanied by lanceolate points, and the lowest deposits of the site dominated by an abundance of well-preserved bone of extinct animals in association with fluted points at ca. 12,500 B.P. Consideration of the macro-features and micro-features of the bone, factors of deposition, agencies of alteration, breakage patterns, and suggestions for bone utilization indicates that the early assemblage most resembles a lithic workshop—a bone quarry and industry based only in part on butchering activities and largely on recovery of bone as a tool resource. (13)

Miller, Susanne J. (see Dort, W., Jr.) (45)

Miller, Virginia Elizabeth (Texas-Austin) A REINTERPRETATION OF MAYA "GESTURES OF SUBMISSION." The term "gesture of submission" has long been used to describe certain gestures frequently depicted in Maya sculpture, murals, and pottery. These gestures include placing the hand on the opposite shoulder or arm, crossing the arms over the chest, and putting the hand in or near the mouth. An examination of Classic and Postclassic representations of figures making these gestures indicates that they are not necessarily captives or subordinates. Early Postcontact accounts support the hypothesis that these gestures can be salutations between persons of equal rank and are often associated with the presentation or exchange of gifts. (38)

Minelli, Laura Laurencich (Bologna) SUGESTION DE MAYOR ANTIGUEDAD DEL BICROMO EN ZONA EN NICoya. Se relata de un nuevo sitio del periodo Bicromo en Zona en el Cerro Barra Honda (pen. de Nicoya, Costa Rica). Dos dolinas resultan de mucho interes: la primera fue utilizada por largo tiempo y durante el periodo Bicromo en Zona como hogar. Una muestra de carbon, proveniente de un nivel intermedio del hogar, resulto,

al analisis del C 14, tener 3400 mas o menos 1000 anos desde hoy: lo que nos sugiere que el periodo Bicromo en Zona puede haber empezado anteriormente al 300 a.C. La segunda dolina fue utilizada como basurero y tal vez tambien como pozo por la misma cultura del Bicromo en Zona. (28)

Minnis, Paul E. (Michigan) PREHISTORIC PATTERNS OF WOOD UTILIZATION AND SUBSISTENCE STRATEGIES IN THE MIMBRES RIVER DRAINAGE, NEW MEXICO. The patterns of utilization of wood resources by the prehistoric populations of the Mimbres River drainage suggest: (1) functional specific use of species; (2) long distance transport of wood; and (3) extensive alteration of the floodplain due to farming. Over 1,400 identified pieces of charcoal from 11 sites are interpreted as to their significance in the general problems of population dynamics and tactical subsistence strategies. This analysis is embedded in an examination of the history of the interpretation of wood remains and its future potential. (1)

Mobley, Charles M. (SMU) ABORIGINAL ADAPTATIONS ALONG THE PECOS RIVER NEAR SANTA ROSA, NEW MEXICO. Archaeological investigations in the Los Esteros Reservoir area have indicated intensive aboriginal activity for the past 2,000 years. Analysis of assemblages from sites of Archaic, Puebloan, and Plains affiliation have indicated an emphasis on local floral, faunal, and lithic resources; although exploitative universes vary through time. These data are used to construct models of resource utilization in which the Pecos River figures as a primary exploitative locus. (27)

Moeller, Roger W. (American Indian Archaeological Institute) THE ROLE OF THE PRIVATE ARCHAEOLOGICAL RESEARCH ORGANIZATION. The American Indian Archaeological Institute is a private, nonprofit, educational facility established as a museum for undertaking local prehistoric research and for presenting regional exhibits. State and federal funding have been received to upgrade our museum, to develop an efficient cataloging system, and to improve and expand our diverse educational programs. While contract archaeology is a recent and logical adjunct to our stated goals, it is not yet a major factor influencing research strategy. However, we have the necessary staff and research facilities for further expansion in this crucial area. (18)

Molina, Diana (INAH) A PRELIMINARY REPORT ON THE CHRONOLOGY OF CACAXTLA. The discovery of an impressive group of Prehispanic mural paintings in Cacaxtla, Tlaxcala, and the characteristics of the other archaeological materials obtained (pottery, lithics, architecture, etc.) pose several questions regarding the validity of the chronological framework for the Late Classic in the area. The presence of elements from the Gulf Coast, Maya region, Xochicalco, and Teotihuacan make Cacaxtla an eloquent example of the complex sociopolitical changes that took place at that time. The mention in the chronicles of the Olmeca-Xicalanca as the inhabitants of the area would seem to imply a closer relationship between Cholula and the south of Puebla that requires a reconsideration of the regional developmental sequences that have been established. (2)

Montet-White, Anta (Kansas) SELECTION PROCESSES IN TOOL MANUFACTURE. A series of lithic assemblages attributed to the Central European Gravettian were examined in an effort to define certain selection processes that operated in tool making. In these assemblages where prismatic blades were the predominant type of blanks, the knapping process was controlled, and, more importantly, size was the major criterion controlling the selection of blanks and the preparation of tools. In that case, there should be marked differences between the distribution of blank measurements and that of specialized tool measurements. And, both the blank and the tool assemblages should differ in some degree from the size distribution of naturally fractured rock fragments. Discussing the observed distribution of measurements taken on blanks and tools from Central European Gravettian sites, this paper presents mathematical models applicable to the study of selection processes. (7)

Moore, Gary L. (Texas A&M) SITE DISTRIBUTION AND FUNCTION IN MUSK HOG CANYON, CROCKETT COUNTY, TEXAS. An archaeological site survey was carried out in the entire Musk Hog Canyon system during the summer of 1976 by members of the Texas Archeological Society's Field School. An estimated 90% of the canyon system was surveyed yielding data on 512 archaeological sites. Site types include burned rock mounds, isolated hearths, chert quarries, rockshelters, rock art, and burned rock scatters. Five sites, all burned rock mounds, were tested to explore their structure and function. Preliminary settlement pattern and site function data are presented. (35)

Moreau, Jean-Francois (Montreal) A BIOLOGICAL APPROACH TO SITE SEASONALITY: SHELL ANALYSIS OF TWO COSTA RICAN INLAND SHELL MIDDENS. A model is constructed from biological observations on actual shell populations that shows that the fluctuations of the means and standard deviations derived from these populations are essentially cyclic on an annual basis for any shell dimension. The application of this model to the shells excavated from two inland shell middens located on the Pacific coast of Costa Rica tentatively suggests that these sites were occupied during a period of eight to nine months (all year except for the long rainy season, August through October). (28)

Morenon, E. Pierre (North Texas State) CONSERVATION ARCHAEOLOGY, MIDDLE RANGE THEORY, AND THE PREDICTION OF PAST LAND-USE PATTERNS. The concept of conservation archaeology is slowly but inexorably conditioning the archaeolog-

ical research being conducted in certain areas of the discipline. One result of this conceptual change is evident in contract archaeological research. Here archaeologists are becoming increasingly involved in middle range theory, a concern with archaeological problems of a limited but substantive nature that contribute to the explanation of a restricted range of empirical variables. One example of this trend, a conservation-oriented study of predictive models of human land-use through time in an area near Taos, New Mexico, is discussed in detail. (43)

Morgan, Larry W. (see Hays, T. R.) (19)

Morris, Elizabeth Ann (Colorado State) PRELIMINARY REPORT ON THE ARCHAEOLOGY OF THE LIGHTNING HILL SITE (5LR284), IN THE FOOTHILLS OF NORTHERN COLORADO. The 1976 Colorado State University field school excavated for eight weeks near a large spring two miles northeast of Livermore, Colorado. An extensive Late Prehistoric occupation level was characterized by small, deeply corner-notched, serrated projectile points, cord-marked ceramics, and hearths consisting of groups of small fire-cracked rocks. Preliminary analysis indicates this type of projectile point is widely found at all elevations in northeastern Colorado. Underlying this stratum were small, apparently isolated projectile point groups of at least four Late and Middle Archaic period occupations associated with hearths of similar manufacture. These include point styles radiocarbon dated at the neighboring site of Spring Gulch (5LR252) between 2000 B.C. and A.D. 500. Twenty cm beneath the Middle Archaic cultural layer were two large slab-lined hearths without diagnostic artifacts. Elsewhere in the site a single Paleo-Indian (Eden?) projectile-point fragment was found on bedrock. Two large shell pendants and dozens of bird-bone beads were associated with a primary burial. A secondary burial with no associated artifacts and lacking cranium, mandible, atlas, and axis vertebrae was also found. (19)

Muller, Jon (SIU-Carbondale) THE KINCAID SYSTEM: MISSISSIPPIAN SETTLEMENT IN THE ENVIRONS OF A LARGE SITE. Mississippian, and to some extent Late Woodland settlement in the Black Bottom of the Ohio River, shows characteristics that are similar to those postulated for other Mississippian localities. These characteristics include location of sites in particular soil/vegetation zones and placement on ground that is above normal flooding. However, very detailed site location survey and testing reveals a pattern of population density and site function that is not consistent with many more grandiose models of Mississippian and other Late Prehistoric social and settlement organization. To the contrary, the Kincaid situation is consistent with that known from early historic sources. (25)

Munday, Frederick C. (Montana) INTERSITE TECHNOLOGICAL VARIABILITY IN THE MOUSTERIAN OF THE AVDAT/AQEV AREA, CENTRAL NEGEV, ISRAEL. Technological variability in a series of Mousterian assemblages is related to resource variability in the Avdat/Aqev area of the Central Negev. Additional determinants of technological variability are reviewed. Subtle shifts in technology through time are related to changes in Mousterian settlement patterns. (33)

Munson, Cheryl A. (see Green, T. J.) (25)

Myers, Thomas P. (Nebraska State Museum) PREHISTORIC TRADE PATTERNS IN THE AMAZON BASIN. Archaeological interpretation often tends to underemphasize the importance of trade to prehistoric peoples, particularly when there is not an obvious ecological rationale. In contrast, ethnographical and ethnohistorical evidence from the Amazon Basin indicates that exchange networks were both widespread and essential to the traditional way of life. Since pottery was frequently exchanged, such networks should be identifiable in the archaeological record even though the reciprocated goods may not have been preserved. (49)

Nance, C. Roger (Alabama-Birmingham) WOODLAND AND MISSISSIPPIAN SETTLEMENT PATTERNS NEAR THE UPPER ALABAMA RIVER, ALABAMA. Four seasons of fieldwork were concentrated just east of Selma, Alabama in an environmental transect of ten townships, aligned north and south, extending from the center of the Fall Line Hills, south, across the Alabama River floodplain, through a portion of the Black Belt, and across the Ripley Questa on the northern Gulf Coast plain. Surface collections from 90 sites, data from test excavations at ten sites, and intensive excavation on one provide information on Deptford, Late Woodland, and Mississippian cultures. Deptford sites are small and widely scattered; pottery seems to have been generally unimportant. Late Woodland sites are larger and far more common; sherd quantities are large, although some sites have not produced house remains on excavation and may not have been permanent villages. The single Mississippian site was evidently a large permanent village, intensively occupied. Most sites are Late Woodland, and here, differing site patterns for the different environmental zones of the transect are compared and analyzed. (53)

Neely, James A. (Texas-Austin) NEUTRON ACTIVATION ANALYSIS AND MESA VERDE-CHACO CANYON CERAMIC TRADE: NEW LIGHT ON OLD PROBLEMS. A brief historical summary of the probable existence of ceramic trade between the Mesa Verde and Chaco Canyon regions is presented. Ceramic types apparently involved and the directions of trade-flow are noted. A neutron activation analysis of a relatively small sample

of sherds from sites in the Mesa Verde and Chaco Canyon regions provides detailed, quantified information concerning the ceramic interchange between these two Southwestern culture centers. The application of Mahalanobis D<sup>2</sup> statistics are seen to augment the analytical technique, thereby refining the results as well as the validity of the interpretations. (41)

Neily, Robert (SIU-Carbondale) SPATIAL SCALING OF STYLISTIC VARIABILITY: A SYNTHETIC APPROACH. The spatial dimension of ceramic design variability is explored through the use of multivariate statistical techniques and an approach is developed which employs a replicable system of style analysis. Both ceramic design symmetry patterns and ceramic design components are examined in an analysis of contemporaneous regional intersite design patterning. The approach tests several scaling and clustering techniques in conjunction with different measures of similarity and distance. Results of the various techniques are presented and recommendations are made with regard to the overall theoretical and methodological bases of studies of design variability in space. (40)

Nelson, Ben (SIU-Carbondale) CLIFF PHASE: THE TERMINAL PUEBLO OCCUPATION OF THE MIMBRES VALLEY. The material culture of this phase, recently deemed a Salado variant, is reviewed. Consideration is given to both culture-historical and behavioral models related to the occupation. The simplistic model of Salado intrusion is rejected, since influences are seen from both Chihuahuan and heartland Mogollon sources. However, the presence of locally made Gila Polychrome in this and the preceding phase conflicts with the old argument of a Tonto Basin genesis for Salado. Possible interpretations of intra- and intersite organization are developed. The terminal pueblo abandonment, which was clearly a rapid one, is evaluated in the light of recently obtained dates. (1)

Nelson, Bonnie A SPATIAL ANALYSIS OF THE CLASSIC SITES OF THE RIO MIMBRES OF SOUTHWESTERN NEW MEXICO. Geographical models are used to assess spatial patterns of the Classic phase sites along the Rio Mimbres. The Classic phase represents the densest puebloan occupation of the valley and is characterized by a range of site size and complexity. The nearest neighbor technique is applied in the analysis of settlement hierarchies in both linear and two dimensional frameworks. Comparisons of the main drainage settlement pattern to that of a sample side drainage are also discussed. The relative value of the various methods employed is considered. (1)

Nelson, Sarah M. (Denver) MODELS OF SHIFTING SETTLEMENTS IN BUTLER WASH, UTAH. A pattern of shifting settlements has emerged from surveying and testing Anasazi sites in Butler Wash, southeastern Utah. Since such a pattern might be due to different underlying causes, two models have been generated. The first is a model of expanding population, with two variants; the second is a model of shifting cultivation with three different periodicities. Finally, the combination of these models is considered. Ultimately, excavational data will demonstrate which of these models is applicable in Butler Wash. (29)

Netherly, Patricia J. (SUNY-Fredonia) ON DEFINING THE NORTH COAST OF PERU. As a culture area, the North Coast of Peru is usually understood to comprise a series of discontinuous valleys lying between the sea and approximately 300 meters above sea level. Study of the socioeconomic organization of the use of natural resources in Chimú and Chimú-Inca times, together with settlement pattern data from earlier periods, suggests that the intervalley littoral and the lower slopes of the Western Cordillera of the Andes to approximately 2,000 meters should be included within the largely self-sufficient sphere of the North Coast societies. A major redefinition of boundaries between highlands and coast occurred under Inca rule and an analogous disruption of the coastal/highland boundary may be hypothesized for the Middle horizon as well. (30)

Neuman, Robert W. (Louisiana State) AN ARCHAEOLOGICAL SURVEY OF THE DRY PAMPA AREA, WESTERN ARGENTINA. In 1974, an archaeological survey was conducted in the dry pampa regions of Mendoza, La Pampa, and Rio Negro provinces, Argentina. The purpose of the survey was to locate and examine prehistoric stone constructions thought to be comparable to those associated with bison drives and others referred to as "tipi rings" on the northern plains of North America. (30)

Nissley, Claudia (see Hester, J. J.) (23)

Noguez, Javier (Tulane) THE TIRA DE TEPECHPAN. This paper will present an analysis of some historic data concerning the kingdoms of Tepechpan and Tenochtitlan (fourteenth-sixteenth centuries) revealed by this Colonial pictorial manuscript of the Acolhua region. (38)

Nolan, Mary Lee (Oregon State) HUMAN CONSEQUENCES OF THE PARICUTIN ERUPTION, MICHOACAN, MEXICO. The eruption of Paricutin volcano in the Sierra Tarasca of Michoacan, Mexico, between 1943 and 1952, severely damaged the economic base of five subsistence farming communities. During the time of geophysical crisis, these culturally similar community groups made different choices from similar options, although the kinds of choices could not have been predicted by knowing only the degree of impact experienced. The most basic socioeconomic changes which occurred in the lives of these people related to differential response to new opportunities offered by representatives of a rapidly modernizing Mexican society. (4)

Nordby, Larry V. (NPS) UPPER PECOS RIVER VALLEY ARCHAEOLOGY: A REVIEW AND A BEGINNING. During the summer of 1976, the National Park Service conducted a cultural resource survey of the upper Pecos River Valley. Lands examined included N.P.S., U.S. Forest Service, and private holdings. The objectives of the survey were to (1) identify site occupants from among several groups who have occupied the valley (Pueblo, Apache, Anglo, Spanish); (2) to create from morphological site typologies a typology of site function which may more closely reflect technological and environment articulation; and (3) to determine whether outlying sites are located according to environmental or cultural interaction parameters, given the role of Pecos Pueblo as a proto-Historic and Historic trade center connecting the Plains with the Southwest. This presentation will review the results of and the degree to which the survey accomplished these objectives. (27)

Norton, Presley (Ecuadorian Anthropological Foundation) LOMA ALTA. The early dates for Loma Alta that there might have been an ethnic boundary between the agriculturalists occupying the floodplain of the Valdivia River and the fishermen occupying its estuary and mouth at 3000 B.C. (uncorrected). The interaction between fishermen and agriculturalists is apparent by the amount of estuary and maritime fauna in the Loma Alta midden some 15 miles inland. The earliest Valdivia ceramic at the type site is a more evolved form of the earlier Valdivia ceramic at Loma Alta and it appears there at the same time as the type site, about 2500 B.C. (uncorrected). Valdivia ceramics appear not to have been readily accepted by the coastal fishermen as can be seen in Valdivia and Real Alto, since a trade ware of different tradition appears first in the up-to-then aceramic midden. Punta Concepcion, on the other hand, is a Valdivia site of occasional occupation where the earliest Valdivia pottery from Loma Alta appears. This site seems to represent seasonal shell collecting by Valdivians. (8)

O'Brien, Michael J. (Texas-Austin) INTRAHOUSE ANALYSIS OF ARTIFACTS FROM A LARGE MISSISSIPPIAN SETTLEMENT IN CENTRAL TENNESSEE. An intrahouse analysis of artifacts and their patterning was undertaken on remains from Mound Bottom, a large Mississippian period community in central Tennessee, to determine how space was utilized within various residential structures. The results, while identifying recurring everyday activities within structures, allowed the tentative identification of areas of craft specialization. (53)

O'Connell, James (see Hayden, B.) (24)

Ohel, Milla Y. (Chicago) THE CLACTONIAN-ACHEULIAN INTERFACE IN BRITAIN: RESEARCH SUMMARY AND CONCLUSIONS. The present study was generated by recent excavations at Clacton, Hoxne, and Swanscombe. It is the contention of this paper that new data derived from these diggings must be incorporated into existing information in order to first reexamine, and subsequently redefine, the long-problematic Clactonian and its relationship to the Acheulian. The present study is the result of detailed analysis of about 9,000 flakes and cores from 41 archaeological units. Results obtained lead to a redefinition of the Clactonian in technological terms. Coupled with environmental and other considerations, the conclusion arrived at is the following: the Clactonian, although having been a distinct technological entity, lasted for a relatively short period of time during the early part of the Hoxnian interglacial, was preserved in only a few isolated enclaves in southeastern England, and disappeared about mid-Hoxnian times with the influx of Middle Acheulian groups of far more advanced technology. Unlike the Acheulian, the Clactonian should not be viewed as a long-lasting, widespread tradition, but rather as an episodic phenomenon, restricted temporally as well as spatially. (20)

Olsen, Stanley J. (Arizona) THE STATUS OF FAUNAL ANALYSIS IN THE PEOPLE'S REPUBLIC OF CHINA. During the month of July 1976, the speaker visited the People's Republic of China, hoping to compare candid material from early sites in China. The status of vertebrate collections and studies as well as the availability of these specimens to workers outside the PRC is briefly discussed. (44)

Ortner, D. J. (see Von Endt, D. W.) (44)

Pahl, Gary W. (UCLA) CONTACTS BETWEEN MAYA FRONTIER CENTERS. The paper discusses the possible contacts and alliance relationships between two major Maya centers: Copan representing the eastern frontier of the Maya realm, and Palenque representing the western frontier. The evidence, which suggests the familial and political bonds between these two centers, appears in hieroglyphic inscriptions from both centers. (55)

Parsons, Cindy J. (see Snavely, A. N.) (15)

Parsons, James J. (California-Berkeley) RIDGED FIELDS IN COLOMBIA AND ECUADOR. Closer examination has led to substantially increased estimates of the areas in "ridged" or "raised" fields in the Magdalena and the Guayas Valleys of Colombia and Ecuador. In the former probably 100,000 hectares, in the latter perhaps 15-20,000 hectares, now appear probable. In addition, it is clear that extensive areas of such Precolumbian fields have been obliterated by flooding and silt deposition. In the San Jorge Valley, Colombia, sedimentation since initial ridge construction has been shown to have been strikingly episodic. At least three paleosols, identified by organically rich black horizons separated by bands of lighter colored alluvium, are identifiable at lowest water stage in silted-up furrows between ridges that line Cano Carate, near San Marcos. Isostatic downwarping of the entire sedimentary

basin has been shown to have been rapid, with rates as high as one meter in 200 years. Radiocarbon dates from these buried soils do not extend beyond 755±80 radiocarbon years, but their true age is almost certainly masked by root contaminants. In Ecuador, under similar conditions, two samples from buried soil horizons at the base of furrows between ridges opposite Guayaquil have given dates of 590 B.C. and 2005 B.C. respectively. In no other samples was organic matter sufficient to provide dates. Since contamination by roots is almost inevitable in most ridged field sites, the oldest dates may be taken as minimal. If the older Guayaquil date could be further confirmed it would make the Ecuador ridged fields more or less contemporaneous with Valdivia and Real Alto. (22)

Patterson, Patience E. (see Davis, E. M.) (19)

Pavesic, Max G. (Boise State) AN ARCHAIC BURIAL PATTERN IN IDAHO. A unique prehistoric burial pattern is coming into focus in western Idaho. While many Idaho archaeologists have recognized the burial complex for over a decade, it is poorly documented in the regional literature. This presentation is a pioneering attempt to describe and explain the pattern. The report stresses the type and distribution of artifactual materials, which include: "turkey-tail" and bi-pointed burial blades, pipes, projectile points, obsidian blanks, marine shell, notched "knives," and red ochre. Final arguments address time range, comparison to local nonburial sites, and evidence favoring an in situ development over an exotic import from the Eastern Woodlands. (45)

Pearsall, Deborah M. (Illinois-Urbana) THE BOTANICAL ANALYSIS OF REAL ALTO: AN INITIAL MODEL OF VALDIVIA SUBSISTENCE. This paper reports the continuing results of the analysis of botanical remains from the Real Alto site, Chanduy Valley, Ecuador. Based on the promising preliminary results of the use of phytolith (silica skeleton) analysis to detect the presence of maize, this technique is refined and applied to additional samples from the site. Initial identification of seeds and fruit fragments from flotation samples is presented and an initial model of prehistoric subsistence developed. (22)

Pearson, Charles E. (Georgia) ANALYSIS OF LATE MISSISSIPPIAN SETTLEMENT ON OSSABAWE ISLAND, GEORGIA. Reasonable statements concerning prehistoric settlement systems as complete units require that the systems be bounded in some meaningful and legitimate manner. Ossabaw Island, Georgia, provides a bounded and relatively undisturbed universe within which rigorous analysis of its Irene phase (A.D. 1300-1550) settlement system is possible. Cluster analysis of site sizes indicates that a hierarchy of sites exists. Each level of this hierarchy is shown to be differentially associated with sets of quantifiable environmental and cultural variables. This variability is seen as reflective of the sorts, as well as numbers, of cultural activities occurring at sites in different levels of the hierarchy. The overall structure of the Irene phase settlement system is compared to that of other Mississippian systems and is shown to differ. This difference is considered to reflect the peripheral position of Irene phase populations to Mississippian development as well as Irene phase adaptation to a marsh-estuary ecosystem. (25)

Pearson, Charles E. (see Graybill, D. A.) (29)

Peebles, Christopher S. (Michigan) DETERMINANTS OF SETTLEMENT SIZE AND LOCATION OF THE MOUNDVILLE PHASE, ALABAMA. The location of Moundville phase (ca. A.D. 1200-1500) settlements in the Black Warrior River Valley is determined by (1) the suitability of local soils for agriculture, (2) the elevation of such soils so as to insure enrichment from floods but also to prevent standing water during the growing season, and (3) the productivity of adjacent biomes for hunting. A large percentage of site size (and presumably population) can be explained by the quantity of maize that can be produced in fields within a 1 km walk of the settlement. Given these constraints of the natural environment, sites exhibit a nonrandom, clustered distribution, and a nearest-neighbor analysis shows a hierarchy of sites which reflects their position in a ritual-regulatory network. (25)

Percy, George R. (see Brose, D. S.) (25)

Perrill, Donald M. (Minnesota-Duluth) THE LOCATION OF ARCHAEOLOGICAL SITES IN THE ICE-FREE CORRIDOR OF NORTH AMERICA: A CONSIDERATION FOR ADAPTATION IN PALEO-FOEHN HABITATS. Data from thermographs in select meteorological stations on the eastern slopes of the Rocky Mountains demonstrate the presence of warm foehn or chinook (snoweater) winds during the winter months. Longitudinal Canadian data on the winter foehn from Lethbridge, Calgary, Jasper, and select stations northwest of Edmonton—Ft. St. John, Ft. Nelson, Ft. Liard, and Ft. Good Hope—demonstrate extremely local climate amelioration in valleys adjacent to particular orographic features. These valley areas frequently remain snow-free due to melting, sublimation, and ablation. Known availability of winter grazing habitats for contemporary ungulate herds suggests similar habitation strategy for Upper Pleistocene ungulates and human predators. This paper proposes a methodology for location of archaeological sites within the corridor and between the Cordilleran and Keewatin ice sheets based on: (1) general approaches in superimposition of contemporary foehn (chinook) isotherms and present settlement pattern distribution in locating potential site areas; (2) specific approaches utilizing past moraine, paleynological, faunal, and artifactual data in predicting location of paleo-foehn habitats within the corridor. (29)

Peterson, Emil (Museo-Banco Central del Ecuador) COTOCOLLAO: A NEW EARLY AGRICULTURAL FORMATIVE VILLAGE IN HIGHLAND ECUADOR. Archaeologists from the Museo-Banco Central del Ecuador have found a Formative village site in the town of Cotocollao, north of Quito. A volcanic eruption about 1000 B.C. sealed off the cultural levels, thus preserving a quantity of organic remains. The site lies on the shore of a now-dry lake bed, and covers one square km. Investigations point to an agricultural base subsistence, supplemented by hunting and domestication of some small animals. Structures appear to be fairly large wood and fieldstone buildings clustered on the banks of several small streams. Ceramic vessel form and decoration are contemporary with the Early and Middle Formative periods of coastal Ecuador, dating from 3500—1500 B.C. (39)

Pickman, Arnold (NYU) CLASSIC MAYA SOCIAL STRUCTURE AS INFERRRED FROM MORTUARY PRACTICES. A study of the distribution of wealth and social identity symbols among 290 Maya burials at three lowland ceremonial centers provides insights into the nature of Classic Maya social structure and organization. Methodology includes a technique, Lorenz curves, used by economists to analyze income distribution. Analysis suggests that "temples" served as mortuary structures for members of dispersed sibs. Rank and status were allocated according to a combined achievement-ascription system. Secular authority and priestly social identities were not necessarily concomitant. Late Classic "palace" burials suggest the emergence of a "new class" sharing wealth and power with the old elite families. (47)

Pilles, Peter J., Jr. (USDA Forest Service) SUNSET CRATER AND THE SINAGUA: A NEW INTERPRETATION. The eruption of Sunset Crater in A.D. 1065-67 has traditionally been thought to have had significant effects upon cultural developments in the area around Flagstaff, Arizona. The ash fall is believed to have created new agricultural lands that attracted numerous people from surrounding culture areas. Resultant integration of the cultural groups produced considerable change between the pre- and posteruptive Sinagua patterns. However, a different interpretation is offered here. Climatic change is thought to have been just as important as the ash fall in creating new farm lands. Posteruptive sites are viewed as redistributions of the indigenous population base, rather than a migrant population increase. It is argued that the eruption of Sunset Crater had very little long-term effect upon the prehistoric inhabitants of the Flagstaff area. (4)

Plog, Fred (Arizona State) THE REVISED SARG RESEARCH DESIGN. Used effectively, a research design is a dynamic tool for organizing and structuring research. As understanding of a particular problem increases, a research design changes to reflect that increase in knowledge. On the basis of results obtained to date, both positive and negative results, modifications in the SARG research design have been proposed. These changes pertain to almost every stage of the research process, from the statement of the problem to the operational definition of specific variables. Some of the more important changes are identified and their relationship to results obtained by SARG members as well as to disagreements that have arisen within the group is discussed. (10)

Plog, Fred (see Wood, J. S.) (50)

Plog, Stephen (SIU-Carbondale) EXPLANATIONS OF CERAMIC DESIGN VARIABILITY IN THE CHEVELON REGION, ARIZONA. Tests of several possible explanations of similarities and differences between ceramic designs at sites in the Chevelon Canyon area of Arizona will be discussed. Variables such as ceramic exchange and design change through time are considered. It is argued that such variables explain a significant amount of the variability between sites in frequencies of ceramic designs and that many recent studies of design variability have not taken these variables into account. (40)

Pohl, John M. D. (UCLA) THE SIGNIFICANCE OF HUMAN SACRIFICE IN THE CODEX ZOUCHE-NUTTAL. This paper will concern the pictorial style used in the Preconquest Mixtec manuscript, the Codex Zouche-Nuttall. The Zouche-Nuttall presents a great deal of ethnohistorical information such as dynastic marriages, political alliances, and warfare, depicted rather simply in other manuscripts, but here often shown as detailed scenes with elaborate ceremonies. The significance of human sacrificial scenes will be discussed in detail. Finally, the means by which the artist of the Zouche-Nuttal was able to use stylized postures to convey specific information concerning relationships between various personages will be reviewed and demonstrated with a short, animated color film. (48)

Pohorilenko, Anatole (Tulane) ON THE CULTURAL AND HISTORICAL VALIDITY OF CHRONOLOGICAL FRAMEWORKS THAT ARE SOLELY BASED ON CERAMIC EVIDENCE: A SYSTEMATIC VIEW. A temporal sequence erected primarily with ceramic material of a given culture or culture area should not be regarded as the cultural sequence or historical process undergone by that culture or culture area. Such a sequence simply reflects the many components of only one cultural complex, ceramics, not those that constitute a whole culture. Though chronological frameworks based on ceramic sequences may be of limited cultural and historical value, the study of ceramics, their distribution, analysis, and classification is important to the archaeological knowledge of an area and to understanding the cultural complexes with which ceramics interrelate. A few such complexes are: trading networks; manufacturing techniques; levels of aesthetic achievement; and the ideational systems reflected in ceramics. I will outline a methodological procedure that would not only enable us to establish a chronological framework processually valid from a cultural-historical

frame of reference, but also limit the role of ceramics to its proper placement within the systems or complexes that make up archaeological culture. (2)

Pollard, Gordon C. (SUNY-Plattsburgh) VILLAGES, SYSTEMS, AND ECONOMICS IN THE SOUTH ANDES. The northern portion of the southern Andes has long been described as an area which was occupied by a variety of sedentary tribal groups during the late Prehispanic period (A.D. 1000—1535). Archaeological work in the area has been relatively substantial, but generally piecemeal and untheoretical. A model is herein proposed that depicts the area of N. Chile, S. Bolivia, and N.W. Argentina as having comprised a network of territorially-restricted village systems that were linked by the exchange of goods and resources. Except for late Inca intrusion and domination, the area remained essentially separate from central Andean cultural developments. (49)

Popelish, Linda (NPS) STYLISTIC ANALYSIS OF ANASAZI ROCK ART FROM CANYON DEL MUERTO, ARIZONA. Design analysis, focusing on elements of form and technique of execution at the motif level, was undertaken for Anasazi rock art, using data from National Park Service surveys of Canyon del Muerto, Canyon de Chelly, northeastern Arizona. Factor analysis produced clusters of elements that define possible "styles" of motifs. These "styles" are seen as indicative of selective categorization of experience and their distribution related to factors of time, social groups, and site function in the canyon system. (40)

Porras, P. Pedro I. (Universidad Católica de Quito) FASE PASTAZA. Se trata de una nueva Fase Arqueológica perteneciente al Formativo Temprano (2000 a.C.) hallada por el conferencista en la llanura Amazonica, al Sudoriental del Ecuador, cerca de la confluencia del Río Huasaga con el Pastaza. Son notables en la cerámica de esa Fase las semejanzas con la de Valdivia en la Costa del Ecuador, pese a que la de la primera tiene morfológica diferente y la decoración es más sofisticada. (8)

Powell, Susan (UCLA) CHANGING SUBSISTENCE PATTERNS AS REFLECTED IN FAUNAL REMAINS FROM THE MIMBRES RIVER AREA, NEW MEXICO. Faunal remains from sites of three periods in the Mimbres River Valley are analyzed. It is proposed that a combination of three major trends in animal utilization occurred: (1) as population increased, agriculture was emphasized and wild game became less important in the diet of people; (2) as agriculture increased, natural communities were altered and animals that became more available were used in greater proportions; (3) as population and food demand increased, a wider range of animal species were used. The reverse of these trends occurred when population decreased. (1)

Price, James E. (Missouri-Columbia) THE POWERS PHASE SETTLEMENT SYSTEM. Archaeological research over the past decade in southeast Missouri near the Ozark border has yielded data on a single Middle Mississippi phase of rather short duration. Studies of climate, soils, vegetation, and other aspects of the natural world coupled with the excavation of two complete villages, tests on other villages, and a large ceremonial center provide a better than average potential for reconstruction of settlement-subsistence strategies of the Powers phase. (25)

Pring, Duncan (see Lowe, G. W.) (21)

Prinz, Elizabeth (Pittsburgh) MESOLITHIC-NEOLITHIC TRANSITION IN THE IRON GATES GORGE. Preliminary analysis of lithic materials from the Jugoslav Danube Gorge Mesolithic and early Neolithic are reported. Results suggest that only minimal economic changes in subsistence occurred upon the introduction of farming. Tentative explanatory hypotheses include both environmental and analytic considerations. The first point is that the Gorge is a unique microenvironment. Second, this analysis is based on the entire lithic assemblage, rather than being limited to the formal tools which are the data base of traditional European lithic studies. Comparative materials are also presented. (7)

Puleston, Dennis E. (Minnesota) RAISED FIELDS IN MESOAMERICA AND SOUTH AMERICA: CULTIVATION OR INDEPENDENT INVENTION. Raised field systems have now been found in a variety of locations in the Americas. Seemingly with origins in the humid tropics, they date back to Early/Middle Formative times in Mesoamerica. With similar dates anticipated for lowland South American fields, the case for a direct link is examined critically. In light of various data a diaspora of riverine floodplain agriculturalists, up along the Gulf Coast of Central America, is proposed. (22)

Purdy, Barbara A. (Florida) EVIDENCE OF LATE PLEISTOCENE HUMAN OCCUPATION IN FLORIDA. Chert implements have been recovered from a deposit formerly considered culturally sterile. These stone remains and their possible chronological placement are discussed. (53)

Purrrington, Burton L. (Appalachian State) CHANGING PATTERNS OF HABITAT UTILIZATION IN A SOUTHERN APPALACHIAN LOCALITY. Statistical correlations of prehistoric components and environmental variables including land form, elevation, aspect, stream order, plant community, and soil type (genesis, parent material, and capability) have been made for the upper Watauga Valley (Tennessee River drainage) of Appalachian North Carolina. Preliminary results suggest a broad spectrum pattern of utilization of several

upland and lowland habitats from late Paleo-Indian through late prehistoric times. However, significant jumps in the proportionate importance of lowland habitats appear to have taken place in Middle Archaic and Middle Woodland times, and a sharp increase in sites on the highest capability soils is evident in late prehistoric (Pisgah phase) times. (5)

Quilter, Jeffrey (California-Santa Barbara) AN ANALYSIS OF PRECERAMIC BURIALS FROM THE LA PALOMA SITE, CHILCA VALLEY, PERU. The burial goods and practices of over 100 burials from the pre-cotton components (6000-4000 B.P.) of the preceramic site of La Paloma are discussed. Qualitative and quantitative analyses have revealed that quantity and types of grave goods, burial wrappings, and grave rituals are correlated with the age and sex of the skeleton. Elaborate burials in which bodies were wrapped in mats, tied with ropes, and then entombed under house floors or in house depressions are discussed. These are compared with summary burials in which the dead were placed in houses that were then destroyed. The latter method of burial is compared with similar practices at the nearby Chilca I village site, which was partly contemporaneous with La Paloma. Implications about the economic and social organization of the La Paloma community are also discussed. (30)

Raab, L. Mark (Arkansas Archeological Survey) ARCHAEOLOGICAL SAMPLE SURVEYING AND A PREDICTIVE MODEL OF SITE LOCATION IN THE OUACHITA NATIONAL FOREST, ARKANSAS. The results of a statistical sample survey of the Caddo Planning unit of the Ouachita National Forest, Montgomery, Pike, Garland, and Hot Springs counties, Arkansas, are presented. The purpose of the survey was to develop a predictive model of site location based on a 1% statistical sample of the planning unit. Sampling was carried out in three stages by means of transects. In addition to archaeological resource information, data were collected about environmental variables associated with archaeological sites. The result of the sampling was a predictive model of site location based on two sources of information. The first is a set of three computer-generated maps that present the estimated likelihood of encountering archaeological resources in the planning unit, based on the statistical sample. The second, and complementary, source is certain data about the environmental settings in which one can expect to find archaeological resources. (50)

Radovanovic, Ivana (Beograd) EDGEWEAR AND TOOLS TYPES AT PETRILOO II. Tools from the 1976 excavations and surface collections at Petriolo II were examined under 40-80 X microscope enlargement at the Institute of Anthropology and Human Paleontology, University of Siena. The assemblage contains tools diagnostic of both Mousterian and a local facies of Gravettian. The original surveyors (Boncompagni, Borzatti, and Zei) and Daniel Evett (1975 excavator) believe the assemblage to be transitional; Chartkoff (1975 excavator) believes two occupations are represented. Edgewear analysis was undertaken to learn whether Mousterian and Upper Paleolithic tools displayed significant wear pattern similarities or differences among types that could be considered functional equivalents on morphological grounds. Both retouched and utilized examples were included in the approximately 200 artifacts studied in the preliminary analysis. None of the classical flake or blade tool types showed consistent edge-wear patterns within types. If it is assumed that systematic wear pattern differences are the result of systematically different uses, the preliminary implication is that tool-makers were using examples of the same type for a variety of functions, and were using examples from different types for one function. Much larger archaeological samples must be taken before the patterning can be accepted, and systematic experimental control samples are needed to better understand different forms of wear, but if the present data patterns continue, the meanings of formal classifications may have to be reconsidered. (7)

Randall, Mark E. (see Lindsay, A. J., Jr.) (26)

Rasson, Judith A. (SUNY-Binghamton) COAST-INTERIOR RELATIONSHIPS IN THE ADRIATIC NEOLITHIC. Neolithic links between the Yugoslav Adriatic coast and the interior beyond the Dinaric Alps have been the subject of many theories, including those of Benac, Korosec, and Srejovic. This paper represents a critical evaluation of these theories in light of the restudy of excavated materials from these two regions. These new data incorporate quantitative measures as well as detailed analyses of ceramic form and decoration. (16)

Rattray, Evelyn C. (UNAM) THE TEOTIHUACAN CERAMIC CHRONOLOGY. LATE TLAMIMILOLPA TO METEPEC PHASES. This paper will present a brief progress report on the second half of the Teotihuacan ceramic chronology. Analyses have been completed on the materials from 25 stratigraphic pits at Teotihuacan and trends of both typical Teotihuacan wares and trade ceramics have been plotted. Questions of underlying theory and statistical procedures used to establish the relative chronology will be discussed. (2)

Ravesloot, John (SIU-Carbondale) THE POST-MIMBRES OCCUPATION OF THE MIMBRES VALLEY: THE CLASSIC PERIOD ABANDONMENT AND THE CASAS GRANDES INTERACTION SPHERE. Data from two Anasazi phase sites that were tested in the summer of 1976 by the Mimbres Foundation will be summarized. The sites are compared with data from Mimbres Classic sites and with Casas Grandes. Evidence from these two sites combined with tree-ring dates from Mimbres Classic settlements suggests an A.D. 1150 abandonment of the valley by the Mimbres population and a repopulation of the area by a Casas Grandes-related or dominated population. (1)

Reher, Charles A. (Wyoming) TERRITORIAL INFERENCE FROM SOURCE ANALYSIS OF LITHIC ASSEMBLAGES. That sources of lithic assemblages indicate the territory being exploited and other aspects of prehistoric behavior is one of the most common

archaeological assumptions. Several specific models have been published which cite factors such as trade across band boundaries, proximity to quarry sources, and direction of movement along a seasonal economic round. These are discussed in constructing a model for testing inferences regarding buffalo kill site assemblages on the Great Plains. The Late Prehistoric Vore buffalo jump in northeastern Wyoming is compared to assemblages from Paleo-Indian, Archaic, Altithermal, and other Late Prehistoric kill sites. Inferences concerning the degree of mobility and residential centralization of the users of these sites are presented. (14)

Reichel-Dolmatoff, Gerardo (UCLA) THE MAGDALENA. Abstract not available. (8)

Reichert, Raphael X. (California State-Fresno) STATUS INDICES IN THE RECUAY CERAMIC GOODS. The Recuay culture, successor to Chavin in the northern sierra of Peru, is largely unknown from excavation. The assembly of a large data bank of photographs of the painted and modeled pottery vessels has, however, permitted the study of some aspects of this culture. In this context, status indices will be discussed, particularly the position of women who are accorded central positions in the art. The roles of Precolumbian Andean women will be discussed in the light of archaeological and ethnographic information and compared to the insights given by the art of Recuay into the status of women in that culture. (49)

Reid, J. Jefferson (Arizona) MOVING ON: THE PROBLEM OF ABANDONMENT AS SEEN FROM GRASSHOPPER PUEBLO. That old-time, Southwest favorite, pueblo abandonment, is exhumed for critical reexamination. The process is defined, a general model is developed, and previous approaches and "explanations" are reviewed. Major points are illustrated by examining the phenomenon at Grasshopper. (51)

Reidhead, Van A. (Missouri-St. Louis) LABOR AND NUTRITION IN FOOD PROCUREMENT: DID PREHISTORIC PEOPLE OPTIMIZE? This study focuses on the decision-making process involved in Late Woodland and Fort Ancient food resource utilization in the prehistoric Ohio Valley. By controlling for seasonal resource availability, nutrient values of resources, costs of resources, human population levels, and population nutrient requirements, a linear programming model of optimal resource utilization was generated. The model identifies those resources that would have been utilized had the people in question chosen to minimize labor in the production of a minimum acceptable nutrient intake. The implications of the model and its test against archaeological data are discussed. The test indicates that use of some resources served to minimize labor, but suggests that decisions to use others significantly added to required labor input. Additionally, the model predicts limiting nutrients on a seasonal basis. This information is useful in examining the nutritional impact of changes in subsistence strategies, such as adoption of corn, and suggests that some nutritional deficiencies may have resulted from the consequences of rational choice rather than population pressure. (46)

Renfrew, A. Colin (Southampton) THE POTENTIAL OF CATASTROPHE THEORY FOR ARCHAEOLOGY. Recent developments in mathematics, largely based on the work of Rene Thom, have permitted the application of catastrophe theory to a number of fields in mechanics, engineering, and elsewhere, where sudden, even discontinuous change, can now be explained coherently in terms of the operation of continuously operating variables. The application of this approach to sudden shifts in settlement pattern (from nucleated to dispersed settlement) will be outlined and the possibility of further applications to systems collapse and to cultural morphogenesis indicated. It is argued that catastrophe theory offers a number of important insights into the dynamics of culture change. (37)

Renfrew, A. Colin (see Smith, E. W.) (4)

Reyes, Roberto (Banco Centroamericano de Integracion Economica) PETROGLIFOS Y PICTOGLIFOS DE HONDURAS: ESTILOS Y SECUENCIA TENTATIVA. Los petroglifos y pictoglyphos han sido un campo descuidado por los arqueologos hasta fechas muy recientes en Centroamerica. Frente al interes que se asigna al menor y mas insignificante fragmento ceramico, encontramos la omision en la consideracion de lo que se ha llamado Expresion Cultural Rupestre. En Honduras se encuentra evidencia procedente de sitios ya conocidos y de varios otros recientemente descubiertos, para postular la existencia de dos estilos de petroglifos, que tentativamente se han ubicado en el clasico tardio y en el post-clasico. Si bien la expresion rupestre tiene un origen muy antiguo, no cabe duda que subsiste simultaneamente con otras formas mas complejas escultorias y pictoricas, hasta la llegada de los espanoles. (28)

Reyman, Jonathan E. (Illinois State) ROOM 44 WUPATKI: REAPING FALSE PROFITS. Several solar alignments were found to be present in the east window of Room 44 at Wupatki. Analysis shows that these alignments were the accidental products of NPS construction and not intended design of the original builders of the pueblo. This analysis provides an excellent example of the problems inherent in the study of architecture at "reconstructed" sites. (51)

Reyna, Rosa (INAH) RELATIVE DATING OF TWO PRECLASSIC SITES IN THE BASIN OF MEXICO. In this paper I will discuss briefly: (1) absolute and relative chronology in the Basin of Mexico, (2) correlations between ceramic, cultural, and chronological phases, and (3) relative datings and ceramic sequences at Tetelpan, D.F. and Teremote, Cuauititlan, Mexico. (2)

Rice, Don S. (Florida State Museum) A COMPARISON OF APPROACHES FOR INVESTIGATING THE HETEROGENEITY AND POTENTIAL PRODUCTIVITY OF THE LOWLAND MAYA ENVIRONMENT. Ecological analyses being conducted in the Central Petén lakes region of Guatemala are providing new information on the nature of environmental heterogeneity in the Maya Lowlands, a diversity which has implications for aboriginal Maya settlement and subsistence, as well as modern land use. Vegetation maps produced through ground surveys and by two different computer classification systems for multispectral ERTS/Landsat satellite data are compared. Methodologies and results are discussed in terms of the structure of the tropical forest environment and the applicability of such analytical techniques for determining the potential productivity of the Petén landscape. (23)

Richardson, James B., III (Pittsburgh) THE TALARA TAR PITS: 11,000 YEARS OF HUMAN UTILIZATION. The preceramic sequence (11,500–4000 B.P.) from the Talara-Chira region of extreme northwest Peru is discussed. The earliest two complexes: the Amotape (11,500–8000 B.P.) and the Siches (8000–6000 B.P.) are unifacial lithic assemblages. These two groups exploited the now extinct mangrove swamp resources from the estuaries at the mouth of the Chira River and Quebrada Parinas and probably late Pleistocene fauna. The later Estero and Honda (6000–4000 B.P.) preceramic assemblages are briefly outlined and emphasis placed upon the shift from littoral exploitation to hunting, gathering, and possibly early agriculture as a result of the continuing Holocene desiccation and the shift of rainfall patterns and mangrove vegetation northward to the Ecuadorian border. In addition, the utilization of the tar pits by the Spanish will be outlined. (30)

Rick, John W. (Michigan) PRECERAMIC HUNTERS OF THE CENTRAL PERUVIAN PUNA. The year-round stability and productivity of hunting resources in the central Peruvian puna is the basis for a model of sedentary and permanent human occupation in the Preceramic period. The Preceramic settlement pattern from a small survey area in Junín reflects the importance of the vicuna as a hunting resource. Excavations in Pachamachay Cave produced the large densities of cultural material and the tool types expected in a sedentary hunter's base camp; while remains from a smaller nearby site suggest a hunting camp function. These and other data confirm the model of non-nomadic, hunting-oriented cultural adaptation. (39)

Riley, Thomas J. (Illinois-Urbana) FIELD SYSTEMS AND FROST DRAINAGE IN NATIVE NORTH AMERICA. Hypotheses concerning the function of prehistoric ridge and furrow garden beds in the upper Midwest were tested by simulation in an experimental field. The garden bed configurations are located in Wisconsin and Michigan tightly clustered on either side of the present 150-day frost-free line. The experimental garden bed tests included measurements of temperature and humidity at stations on ridges and furrows to determine whether these features served as frost drainage mechanisms in an area with marginal growing seasons. The results of the experiments and their implications are discussed. (6)

Robertson, Donald (Tulane) SOME MEXICAN PICTORIAL MANUSCRIPTS IN THE TULANE UNIVERSITY LATIN AMERICAN LIBRARY. This paper will present, with slide illustrations, some remarks on the Early Colonial manuscripts in the Tulane collections, including the Codex Tulane and other pictorial documents such as the Techialoyan codex Xonocatlan and an early copy of the Codex of Coahuacalco. (48)

Robertson, Merle Greene (Tulane) A CORRELATION BETWEEN THE CODEX TRO-CORTESIANUS AND PALENQUE'S EAST SUBTERRANEO. A large portion of the Codex Tro-Cortesianus is concerned with the ritual hunting of deer by gods for the purpose of sacrifice. Page 14 portrays a deer straddling a serpent, while God A, in death guise and brandishing a torch, follows closely behind. This scene is sculptured at Palenque, House E in vault 2 of the eastern subterranean passage where a realistic deer crouches on the eastern head of a saurian dragon which frames the arched entrance to the underground chambers. The Sun God crouches on top of the western head of this creature. The iconographic portrayal on this vault front portrays the purpose for which the subterranean chambers must have been used, and substantiates and reenacts the scene portrayed in the Codex Tro-Cortesianus. (38)

Robertson, Patricia Crown (Arizona) DISTRIBUTION AND FUNCTION OF PRE-AGGREGATION COMMUNITIES IN THE GRASSHOPPER REGION. The Late Mogollon II period in the Grasshopper region of east-central Arizona was defined by H. David Tuggle according to ceramics, architecture, and distribution of sites. Recent excavation and survey confirm the cultural and behavioral distinctiveness of this period and permit revisions in Tuggle's original definition. Site locations are analyzed according to their association with specific environmental variables. Significant developmental trends are evident when Late Mogollon II sites are compared with the larger site of Grasshopper. (51)

Robinson, R. W. (see Eggers, A. V.) (45)

Robles, Ferdinando (see Benavides, A.) (31)

Rock, James T. (USDA Forest Service) BUREAUCRACY AND CULTURAL RESOURCE MANAGEMENT. The paper discusses the practical and plausible implications of developing a cultural resource program within an established federal bureaucracy. The bureaucracy is Klamath National Forest, USDA. The cultural resource program emphasizes material cultural item identification, preservation, and protection; yet, CRM, as it must exist, is not, cultural item identification, preservation, and protection; yet, CRM, as it must exist, is not,

Indeed cannot be, restricted to archaeological materials alone. The development of the present program is outlined, and its strengths and weaknesses are discussed. (26)

Rockman, Diana diZerega (NYU) THE HOPEWELLIAN WAY OF DEATH. In this study, several attributes related to mound burials are compared among several Middle Woodland regional traditions that have been linked in the literature as participating in the Hopewell Interaction Sphere. It is demonstrated that there are statistically significant differences among the regional traditions for most of the attributes examined. This conclusion tends to support the hypothesis that the regional traditions participating in the Hopewell Interaction Sphere did not have a common ceremonial-mortuary complex or a shared ideology; rather, these ideologies and mortuary practices were related to various aspects of the individual traditions themselves. (17)

Roosevelt, Anna (Museum of the American Indian) LA GRUTA, AN EARLY CERAMIC PHASE OF THE MIDDLE ORINOCO BASIN. A new ceramic phase related to the Saladoid series has been identified in the Parima region of the Middle Orinoco Basin, Venezuela. Although there are problems with the dating of La Gruta, four radiocarbon dates suggest placement of the phase in the early second millennium B.C. The artifactual remains found in refuse of the phase indicate a subsistence system of manioc cultivation and animal capture. Human population density appears to have been very low during the La Gruta occupation, contrasting with that of later periods, when maize and beans were under cultivation in the region. (8)

Roper, Donna C. (Missouri-Columbia) SITE CATCHMENT ANALYSIS: AN OVERVIEW. During the last decade, Old World archaeologists working with paleoeconomies have developed site catchment analysis. The technique also has large potential for use in North American settlement-subsistence systems analysis. It is a behaviorally based approach, following from the ethnographic observation that human communities supply their needs and wants by exploitation of a territory, normally that segment of territory within a few miles of the locus inhabited. Data assumptions and requirements are not overly stringent. Examples from applications in Illinois and Missouri illustrate the utility of site catchment analysis for settlement system modeling. (52)

Rose, Richard M. (Hampshire) MUSHROOM STONES AND THE MAYA BALL GAME. Mushroom stones are generally believed to be representative of a divinatory mushroom cult among the Formative and Classic period Maya of Highland Guatemala. Analysis of close to 300 mushroom-shaped stone and pottery objects has provided iconographic and structural data suggesting an intimate relationship between mushroom stones and the Maya rubber ball game ritual. It is argued that mushroom stones were employed in the manufacture of the sacred rubber balls used in the game and that mushroom stone iconography is representative of the players and deities of the game. In addition to establishing a new interpretation of mushroom stone meaning and function, the present hypothesis provides important new data on the Maya ball game. (47)

Rosenberg, Bettina H. (Salt River Project) THE CORPORATE VIEW OF CULTURAL RESOURCE MANAGEMENT. Although federal and state regulations are often the only factors compelling private companies to undertake archaeological investigations, some utilities such as Salt River Project, Phoenix, Arizona, have recently become aware of the need to do more about cultural resources than just what is required by law. Any activity by a utility on federal or state lands requires compliance with many regulations. Such compliance involves the need for surveys of areas of proposed construction, and for mitigation measures at those locations of potential impact. Archaeological activity on private land may also be required if a project (such as a nuclear or pumped storage project) is federally licensed or if federal funding is involved; but in most cases a concern for cultural resources on private land remains a choice for the industry. Salt River Project has established a procedure that sets the stage for compliance with existing laws and also provides the necessary steps to protect archaeological resources where federal and state legislation is not applicable. (43)

Rothschild, Nan A. (Lehman, CUNY) SKELETONS IN THE CLOSET: THE ANALYSIS OF PREHISTORIC SOCIAL ORGANIZATION THROUGH MORTUARY SITES. In order to test the hypothesis that societies with different subsistence bases will structure their social systems and bury their dead according to different principles, two large mortuary sites were analyzed. Artifactual inclusions with burials were the basis of cluster analyses of Indian Knoll and Dickson Mounds. Multiple-artifact burials at the former site produced two major clusters resembling lineages; at the latter, several clusters predominantly of one age or sex group were produced by this inductive test. (17)

Ruddy, F. H. (see Wessen, G. C.) (44)

Rugge, Dale (California-Santa Barbara) PETROGRAPHIC STUDIES OF THE MIMBRES CERAMICS WITH AN EMPHASIS ON INTRAREGIONAL TRADE PATTERNS. This section analysis of ceramics from a spatially and temporally diverse sample of sites within the Mimbres Valley is described. Correlation of sherd thin-sections with mineralogical analysis of temper sources is given. Documentation for locally produced and traded ceramics is given. Evidence for substantial trade of Mimbres corrugated jars over a 30-mile stretch of the valley is given; this trade is shown to fit a linear distance model. (1)

Rugge, Peggy (California-Santa Barbara) TEMPORAL AND SPATIAL VARIATION IN THE SELECTION AND USE OF LITHIC MATERIALS IN THE MIMBRES VALLEY. Lithic materials from sites spanning a 1,100-year period of time in the Mimbres Valley are

evaluated. Changes in raw material selection are measured against raw material availability. Changes in assemblages are considered in terms of changes in resource utilization over this time span and relative availability of various classes of raw materials within the valley. (1)

Runnels, Curtis (Indiana) **ECONOMIC MAN IN THE PREHISTORIC AEGEAN: 8,000 YEARS OF ANDESITE EXPLOITATION.** There has been little or no recognition in the literature on Aegean prehistory of the Formalist-Substantivist debate in economic anthropology. Yet some archaeologists working in the Aegean have used economic theory drawn primarily from the Substantivists. In the Argolid, southern Greece, there is archaeological and ethnographic evidence for the exploitation of andesite for ground stone artifacts from the eighth millennium until the present. It is argued here that certain spatial and temporal variations in this exploitation are best explained by postulating rational, economic choices rather than other factors. Models based on ethnographic and historic examples and utilizing Formal economic theory are offered to explain the prehistoric use of alternative sources of andesite. (46)

Ruppe, Reynold J. (Arizona State) **ANALYSIS OF MATERIAL FROM THE VENICE, FLORIDA, UNDERWATER ARCHAEOLOGICAL SITE.** Two summers of fieldwork involving search for drowned terrestrial sites on the continental shelf off Venice, Florida, and partial excavation of an archaeological site with both underwater and land components have produced considerable information. Results of analysis of the recovered material have confirmed a number of the hypotheses proposed in the research design. Underwater and land components of the site differ in local environment, subsistence patterns, coastal geomorphology, and temporal placement. Environmental differences between the components are significant. Pollen analysis indicates an arboreal flora during occupation of the underwater component and a high marsh flora during the land formation period. Frequencies and quantities of edible shellfish differ between components indicating changes in brackishness of local waters. A study of carrying capacity of local water bodies confirms a hypothesis of radical change in coastal geomorphology. Sea level changes created drastic changes in the lives of the site(s) inhabitants. (53)

Salerno, Michele A. (Toronto) **A THIN-SECTION ANALYSIS OF JOMON POTTERY FROM THREE SITES IN JAPAN.** Thin-section analyses were done on pottery temper from the three Jomon sites: the Hime site, Kyushu; the Seizan site, Nanae, Hokkaido; the Hamanasuno site, Minamikababe, Hokkaido, Japan. The analysis was made in an attempt to answer some cultural questions concerning Jomon ceramics. Since the three sites adequately spanned the period from Initial Jomon to Final Jomon, the analysis results include a discussion of the ceramic temper changes in Jomon pottery through time. This study discusses source areas of temper and clay and the possibility of trade networks during the Jomon period. Behavior patterns of potters in terms of clay collection and temper selection are also explored. (54)

Salmon, Merrilee H. (Arizona) **THE SYSTEMS THEORY APPROACH TO EXPLANATION IN ARCHAEOLOGY.** Some archaeologists have urged adoption of a "systems approach" to explanation in archaeology because they believe that this approach is superior to the D-N model of explanation. They claim that the D-N model does not do justice to the multivariate nature of causality and that it requires laws of a kind which are unavailable to archaeologists. In the paper I show that the systems model of explanation, as developed by E. J. Meehan, suffers from the very same defects as the D-N model, and so it is also unsuitable as a model of explanation in archaeology. Alternative models, better suited to archaeology, are suggested. (37)

Salmon, Wesley C. (Arizona) **NEW MODELS OF SCIENTIFIC EXPLANATION.** In response to archaeologists' interests in models of scientific explanation, this paper surveys several different "covering law" models. Primary emphasis is upon a critical comparison of Hempel's deductive-nomological and inductive-statistical models with the more recent statistical-relevance model. The crucial difference hinges upon certain relevance conditions. Two advantages of the latter model, of possible interest to archaeologists, are its ability to incorporate explanations of low-probability events and its potential for furnishing an account of functional explanation. Toward the end, suggestions concerning supplementation of the statistical-relevance model with causal relevance factors are advanced. (37)

Sanger, David (Maine-Orono) **UNIVERSITIES AND THE STATE HISTORIC PRESERVATION OFFICER.** Federal regulations require that SHPO's have qualified prehistoric and historic archaeologists on staff. In those states where this imposes a problem, one alternative is to work closely with other institutions that have such archaeologists. In Maine, four archaeologists each devote one day a week to an Advisory Committee to the SHPO. This arrangement allows compliance with federal regulations in states where government is unwilling to provide the necessary professionals. University-based archaeologists also become involved with the review process and the very basis of cultural resource management resulting in what may be a superior management plan, as greater expertise and experience are available to the SHPO. (18)

Sanoja O., Mario (Universidad Central de Venezuela) **LA TRADICION BARRANCOIDE Y EL FORMATIVO SURAMERICANO.** Los orígenes de la tradición barrancoide, parecen estar ligados al Formativo suramericano y al desarrollo de los cultivos vegetativos en el norte de Suramerica. De manera general, se podría postular a Puerto Hormiga como el sitio

ancestral de la tradición, hecho en el cual coinciden la mayoría de los investigadores del área. Es posible, igualmente, que Puerto Hormiga constituya uno de los centros o el centro de domesticación de la variedad no tóxica de la yuca, la cual habría constituido uno de los soportes de la economía de subsistencia de las poblaciones tempranas del norte de Suramerica hasta  $\pm 1200$  a 100 a.C., cuando habría tomado auge en esta región la utilización de la variedad tóxica de la yuca merced a la creación del complejo de técnicas y artefactos de cestería adecuados para tal fin. Podríamos hablar, quizás, de unformativo de las regiones bajas del norte de Suramerica originado a partir de Puerto Hormiga y otra variante que, a partir de Valdivia, habría estimulado el desarrollo del Formativo en los Andes Centrales. No obstante, estos procesos históricos se habrían dado dentro de un marco de contactos interregionales que permitieron la difusión en ambos sentidos de diversos elementos superestructurales, particularmente los alfareros. (9)

Schele, Linda (South Alabama) **THE BUNDLE IN MAYA HIEROGLYPHICS AND ICONOGRAPHY.** The T684 "bundle" glyph is one of several graphemes used in the Early and Late Classic monuments of the Maya to record accession events. The iconic version of the "bundle" grapheme appears in palace and ancestral bloodletting scenes. Ethnohistoric sources record data on the "bundle" which correspond to its iconographic and glyptic uses in Classic times. Its behavior linguistically and glyptically indicate associations with tribute, bark cloth, and the shrouded remains of ancestral progenitors. (38)

Schiffer, Michael B. (Arizona) **THE REUSE PROJECT.** This paper reports the results of the first two seasons of work on the Reuse Project, an ethnoarchaeological investigation in contemporary Tucson, Arizona. Preliminary findings are discussed relative to reuse patterns and socioeconomic groups, and the implications for prehistoric research are noted. (42)

Schmidt S., Paul (UNAM) **THE CERAMIC SEQUENCE OF XOCHIPALA, GUERRERO.** Analysis of both surface and stratified ceramics from the Valley of Xochipala have yielded what appears to be a sequence including Preclassic, Classic, and Postclassic materials. The paper will consist of the presentation of the first draft of the Xochipala ceramic phases and their correlation with Mesoamerican periods. (2)

Schneck, Robert J. (see Neely, J. A.) (41)

Schneider, Fred E. (North Dakota) **HENDRICKSON: A COALESCENT FORTIFIED SITE IN EASTERN NORTH DAKOTA.** Excavations at a fortified site along the James River in southeastern North Dakota have revealed the presence of a prehistoric culture not previously recognized in this region. The Hendrickson site, 32SN403, is composed of a fortification ditch surrounding three circular depressions. Outside the ditch there are two circular and two rectangular depressions. Excavations cross-sectioned the ditch and investigated portions of one interior circular depression and one exterior rectangular depression. Preliminary analysis of the excavation data indicates a cultural affiliation with the Coalescent tradition. Radiocarbon dates indicate a temporal placement of the site at approximately A.D. 1450. (19)

Schneider, Kent A. (USDA Forest Service) **CULTURAL RESOURCES AND LAND USE PLANNING: ARCHAEOLOGY AND GRID, PHASE I.** This paper describes an experimental approach involving 20,000 acres of National Forest land in Green County, Georgia. Using the GRID computed mapping program, we will compare the known archaeological sites with other inventoried variables to generate computer models for predicting the existence of additional archaeological site locations and types. Each model developed will then be tested and field checked. More than two-thirds of the Chattahoochee-Oconee National Forests' 800,000 acres have been inventoried utilizing GRID. Twenty variables, such as land form, water regime, forest type and streams, have been mapped. GRID allows us to compare and analyze the relationships among these variables and graphically display the results. (50)

Schoeninger, Margaret J. (Michigan) **DIET AND SOCIAL STATUS DURING THE FORMATIVE PERIOD IN MESOAMERICA.** Archaeological records show that a great increase in human population size and in complexity of social organization occurred during the Early and Middle Formative periods in central Mexico. Dietary correlates of these changes in population size and organization have usually been determined indirectly. Archaeologists have been limited by the assumption that available food resources or associated food remains indicate utilized foods. This does not allow precise differentiation between diets of groups within a population or between populations in similar ecological situations. Strontium content was determined in bone samples from Chalcatzingo, Morelos, and two sites in Oaxaca-Huitzo and San José Mogote—to identify differences in the proportion of meat in diets within and between social groups during the Early and Middle Formative. Ethnographic accounts from the early contact period indicate that meat was a high status food often limited to upper levels of society. Thus, differences in the relative amount of meat in diets of various groups can be expected to reflect social differences. (34)

Schroeder, H. Bruce (Toronto) **NACHCHARINI, A STRATIFIED POST-NATUFIAN CAMP IN THE ANTI-LEBANON MOUNTAINS.** As archaeological evidence accumulates from sites in an expanding range of geographical and environmental zones, Levantine prehistorians are confronted by an increasingly diverse array of behavioral patterns and adaptive strategies during the early Holocene. It has also become apparent that the diversity of adaptive

responses to early Holocene environmental and social conditions continued into the Holocene beyond the establishment of village farming. This paper will examine aspects of post-Natufian subsistence practices as suggested by the ecological situation on the high plateau (2,000 meters) of the Anti-Lebanon Mountains and as evidenced by the archaeological remains from the cave site of Mughara et-Nachcharini. (33)

Scott, Thomas R. (SMU) THE HARIFIAN OCCUPATION OF THE NEGEV AND SINAI. Harifian sites dated to the ninth millennium B.C. were first discovered in the Negev and Sinai only a few years ago. The paper first describes the material culture of this hunting and gathering group and proceeds to discuss the distribution of Harifian permanent base camps and more ephemerally occupied sites. Two different models for Harifian transhumant economy are examined and one is shown to be more satisfactory. (33)

Seeman, Mark F. (Kent State) A LOCATIONAL ANALYSIS OF HOPEWELL SITES IN THE EASTERN UNITED STATES. Central Place Theory, a concept developed in economic geography, will be used to analyze the spatial distribution of Hopewell mortuary sites in the eastern United States. Initially, the structural complexity of the Hopewell Interaction Sphere as recently put forth by Struever and Houart (1972) will be examined. Particular attention will be given to both their criteria for constructing typology of sites and their conclusions. The distribution of Hopewell mortuary sites will then be reanalyzed using a Central Place Theory approach. Results, in contrast to the Struever and Houart model, suggest a highly asymmetrical system with the major concentration of complex sites in Ohio. The effects of three variables contributing to this distribution will be discussed. (46)

Serra, Mari Carmen (UNAM) A PRELIMINARY STUDY OF THE CERAMICS OF TERREMOTE, MEXICO, D.F. This paper reports recent field work at Terremote, D.F. Terremote, a Formative site located in the southern basin of the Valley of Mexico is an ideal site for experimentation with sampling techniques because of its size and character. Intensive surface survey is being carried on in the 15-mound core area (approximately 200 x 100 meters). A much larger area is being systematically collected using a concentric circle grid layout. The preliminary analysis of the materials from the surface survey and from a series of stratigraphic pits is providing a greatly refined chronology for the Middle Formative and Terminal Formative phases and may clarify some problems concerning the transition to the Classic. (2)

Shadow, Robert D. (SUNY-Stony Brook) HIGHLAND-BARRANCA CONTRASTS IN THE BOLANOS VALLEY, WEST MEXICO. Beginning in the Classic, ca. A.D. 400, two completely contrasting ceremonial settlement types appear in the Bolanos Valley. These contrasts are basically maintained throughout the Postclassic. The barranca settlements are characterized by circular pyramids with circular patios and banquettes that are derived from the highland lake zone to the south and best observed at Teuchitlan, Ahualulco, and La Providencia. The highland centers are rectangular and have vague relationships to those of the Zacatecas valleys to the east and north. It is postulated that the barranca settlements were on a lake zone sponsored trade route to the north, while the highland settlements represent a backwater area that has its roots in a Canutillo-type expansion. Interrelationships between the two zones will be discussed. (34)

Shafer, Harry J. (Texas A&M) THE ARCHAEOLOGY OF HINDS CAVE: THE 1976 SEASON. Major excavations continued at Hinds Cave, a large dry rockshelter site, during the summer of 1976. Investigations were begun in the summer of 1975 with the aims of securing controlled samples of plant macrofossils, human coprolites, and material culture items including perishables. The first year accomplishments include excellent plant macrofossil and coprolite samples from the upper half of the 8,000-9,000 year-old sequence of cultural fill in the cave and background data on paleoenvironmental and dietary studies. The objectives during the 1976 season included completing the sampling through the lower half of the Archaic deposit and continuing the paleoecological studies. The archaeological findings are reported in this paper together with a statement of objectives for the overall Hinds Cave research project. (35)

Shafer, Harry J. (see Moore, G. L.) (35)

Sharp, Rosemary (Harvard) TRADING CHIEFS TO WARRING KINGS: THE POLITICAL NEXUS OF SYMBOLIC FORMS DURING THE MESOAMERICAN EPICLASSIC PERIOD IN NORTHERN YUCATAN. Diverse trader-chiefs, probably including the Putun Maya, lacking the power of a military monopoly, attempted during the Epiclassic period to bind together a heterogeneous local population in the northern lowlands by use of artificial symbiosis, and to buttress their international position by participation in an ideological system involving a feathered-serpent cult and a monumental architectural style. (47)

Shaw, Chester (SMU) LITHIC EXPLOITATION AND TECHNOLOGY IN THE UPPER PECOS RIVER VALLEY. Data resulting from excavations in the Los Esteros Reservoir area document occupations by several aboriginal cultural components within the last two millennia. Analysis of assemblages from these sites indicates temporal stability in chipped stone tool manufacture but fluctuation in the sources exploited. Lithic technology is found to vary according to raw material uniformly for all components and in some cases with respect to the distance from source localities. (27)

Sheehy, James J. (Arizona) ARCHAEOLOGICAL INVESTIGATIONS AT TRAVESIA, HONDURAS: A PRELIMINARY REPORT. Recent salvage archaeology undertaken at the site of Travesia is described and data on the architecture and ceramics are summarized. Preliminary indications are that Travesia was occupied from the beginning of the Late Classic period to, and possibly including, the Early Postclassic period. It is suggested that this period might be divisible into four phases. The first three phases are distinguished by changes in polychrome ceramic designs and vessel shape and the fourth by the presence of a fine paste ceramic tradition that, although showing form similarities to Fine Orange ceramics, appears to be a distinct and local tradition. (36)

Sheets, Payson D. (Colorado-Boulder) ENVIRONMENTAL AND CULTURAL IMPACT OF THE VOLCAN ILOPANGO ERUPTION, EL SALVADOR. The ca. A.D. 200 eruption of Volcan Ilopango sufficiently damaged arable land over a few thousand km<sup>2</sup> to necessitate migration of many Protoclassic Maya. Recent and past archaeological and geological research are synthesized to indicate the nature and magnitude of the disaster. Pre-eruption land use and settlement patterns may have unwittingly concentrated populations into zones of maximum damage. Vegetative and soil recovery allowed for major human reoccupation during the Early Classic. (4)

Sheldon, Elisabeth (Georgia State) THE BLACK BELT PRAIRIE OF ALABAMA: FEAST OR FAMINE. The Black Belt prairie in central Alabama (extending into northeast Mississippi) is a crescent-shaped region of calcareous clay soils underlain by Selma chalks of late Cretaceous age. Before European settlement, its oak-hickory forest was distributed in a mosaic of open prairie and savannah areas. This study will examine distribution of archaeological sites within this environment from the four major time periods and relate their respective subsistence systems to it. (53)

Shimada, Izumi (Arizona) THE ECONOMY OF URBAN CONTEXT AT MOCHE V PAMPA GRANDE: COMMODITY AND LABOR FLOW. The complex Moche V site of Pampa Grande (ca. A.D. 600-700) manifests monumental pyramids, formal storage complexes, and networks of corridors. Based on the assumption that corridors are the reification of "articulation" among components of a socioeconomic system, our excavation strategy revealed dispersed, low-output manufacturing areas spatially segregated from residential structures. A commuting labor force appears to have been fed by food transported from specialized kitchen and storage areas. The rapid establishment and continuous growth of the site necessitated creation of new social forms and pathways for the flow of commodities. The procurement of raw materials and the processing and distribution of products will be considered. (49)

Shimada, Melody (see Shimada, I.) (49)

Shutler, Mary Elizabeth (Washington State) POTsherds AND PEOPLE. The paper is an examination of the possibilities of reconstructing prehistoric social groups from the patterning of archaeological remains in the Pacific area, in general, and from the ethnographic and archaeological study of Wusi Village, in the New Hebrides, in particular. (24)

Shutler, Richard, Jr. (see Shutler, M. E.) (24)

Simmons, Alan H. (SMU) PRE-POTTERY NEOLITHIC B OCCUPATIONS OF THE WESTERN NEGEV, ISRAEL: ECONOMIC POTENTIALS. A systematic archaeological survey was recently undertaken within selected wadi systems in the western Negev of Israel. Two research objectives were examined. The first was to view settlement patterns through time in one major wadi system while the other was to concentrate on PPN-B settlement and economy in the region. Coeval with this second problem, an examination of previously collected PPN-B assemblages in the western Negev was undertaken. Site catchment analysis was one technique employed in an attempt to assess the economic potential of major sites. Preliminary results are reviewed in this paper. (33)

Skinner, S. Alan (SMU) QUALITY CONTROL IN AMERICAN ARCHAEOLOGY. The advent of the 1970's has resulted in a flurry of archaeology through the United States. The frantic pace has brought to the forefront concerns about professional standards, registration of archaeologists, and quality control. At present, quality control has been relegated to a stage that might be referred to as the Alpha-Omega stage. The A-O stage begins with competitive bidding and ends with peer review of final reports. While I have no qualms about these polar concerns, it seems that there is also a need for quality control during that real world period between the beginning and the end. (26)

Smith, Bruce D. (Georgia) VARIATION IN THE COMPLEXITY OF MISSISSIPPIAN SETTLEMENT PATTERNS. Eastern North American archaeologists have tended to work with a rather general, abstract Mississippian settlement pattern-system model that could theoretically be applied with few modifications to large geographical areas of eastern North America. This approach of looking for similarities between Mississippian settlement patterns has not surprisingly tended to ignore the great degree of variation that exists between such systems. A fairly large sample of recently developed Mississippian settlement pattern models will be analyzed in terms of the evident dimensions of variation, as well as in terms of observed similarities between patterns. These observed dimensions of similarity, and variation will be discussed in terms of possible ecological and cultural factors. (25)

Smith, Erasmus W. (Southampton) MINOAN CRETE AS LOST ATLANTIS? THE THERA ERUPTION OF ca. 1500 B.C. Thera underwent a cataclysmic eruption of Plinian type ca. 1500 B.C., with the destruction of the extensive settlement at Akrotiri recently excavated by Marinatos and Doumas. Different estimates have been made of the effect of this disaster, by ash fall, tsunami, and earthquake in the Aegean and beyond; the destruction of the Minoan palaces of Crete and even the loss of "lost Atlantis" have been attributed to it. The evidence is briefly reviewed, with reference to deep-sea cores and to analysis by Drs. Dorothy and Charles Vitaliano of tephra samples from recent excavations on Melos. Comparable work on Crete is needed to establish the tephra chronology required for definitive interpretation. (4)

Smith, Landon D. (USDA Forest Service) EXPERIMENTAL DISCRIMINATION OF PERCUSSOR TYPE BY DEBITAGE ANALYSIS. Archaeologists have long expressed a concern with the role and effect of the percussor in stone tool manufacture on the tools produced. The subjective appraisal of these effects are subjected to statistical analysis using the debitage from six bifaces, each of which was experimentally produced using a hammer of different material and, consequently, different weight-density. Multidiscriminate analysis supports a quantified difference between hard and soft hammers as evidenced by morphological variables such as various flake and platform dimensions as well as several ordinally scaled attributes. While the effect of the variation due to different knappers is relatively minor, much work remains to be done in this area. The overall importance of this approach for discriminating manufacturing technique through debitage analysis is apparent. (3)

Snarskis, Michael (Museo Nacional de Costa Rica) FINCA GUARDIRIA: FIRST ANALYSIS OF A FLUTED POINT INDUSTRY FROM COSTA RICA. Surface collections at Finca Guardiria, a site in the Turrialba Valley of Costa Rica, have recently yielded 15 examples of Clovis-like points and knives or preforms, along with numerous steeply keeled end-scrapers, large sidescrapers, and heavy concentrations of flint chipping debris. Ceramics are also present at this site, but no radiocarbon dates are as yet available. Morphologically and geographically, the points are intermediate between the classic Clovis points to the north and the fishtail points of South America. If shown to be Paleo-Indian, the Finca Guardiria points may represent the beginnings of technological change as the early hunters adapted to the tropical forests on their way south. (28)

Snavely, Alan N. (Pennsylvania State) SIMULATION AND BLACK BOX PROCESSES; FOREST GROWTH AND INTRASITE ARTIFACT DISTRIBUTION. Efforts by archaeologists to create explanatory statements of sociocultural events and processes are largely frustrated by the constraint of dealing with "black box" phenomena. The ability to delineate and study the parameters of incompletely observable systemic processes thus depends upon the creation of sophisticated analog models. Computer simulations, in particular, possess the potentially powerful attributes of dynamism, visibility, and system/model control. The applicability of this modeling technique for archaeology is demonstrated by a simulation program (SETUR) developed to investigate the impact of forest growth upon intrasite artifact distribution and patterning. The structure of this simulation is presented and discussed, as are the methodological implications of the quantitative rigor demanded by simulation. The consequences of artifact displacement for archaeological survey, intrasite data collection, and behavioral interpretations are also examined. (15)

Solheim, Wilhelm G., II (see Griffin, P. B.) (24)

Specht, J. R. (The Australian Museum) A REVIEW OF ETHNOARCHAEOLOGY STUDIES IN NEW GUINEA. A brief review of postwar ethnoarchaeological studies in New Guinea, emphasizing village settlements, and pottery-making and lithic studies; with some comments on the reappraisal of the archaeology of New Guinea and Australia that has resulted from the recent work. (24)

Spence, Michael W. (Western Ontario) LATE MIDDLE HORIZON OBSIDIAN PRODUCTION IN TEOTIHUACAN, MEXICO. Although data are accumulating on the collapse of Teotihuacan, both the processes leading up to it and the event itself remain poorly understood. A great deal more information is needed on the last centuries of Teotihuacan, on its internal structure as well as its external relationships during those critical years. Obsidian dating allows the identification of some late Teotihuacan obsidian workshops, which in turn gives us some idea of the changing structure of the Teotihuacan obsidian industry at that time. (34)

Spielbauer, Ronald H. (Miami) A SUGGESTED ELEMENTAL SOLUTION TO THE IDENTIFICATION PROBLEM OF THE CONCENTRICALLY BANDED, BLUE-GRAY CHERTS FROM SOUTHERN INDIANA AND ILLINOIS. Recent investigators into prehistoric utilization of lithic raw materials, such as chert, have recognized the need for identification and characterization of these lithic resources before their acquisition and subsequent distribution can be effectively studied. Discrimination between blue-gray cherts available from sedimentary deposits in both southern Indiana and Illinois has been seen as constituting a problem area in Midwestern archaeology. Attempts to distinguish between these two areally distinct sources through macroscopic and microscopic techniques have not yet met with success. On the other hand, elemental composition analysis, or trace element analysis, appears to show promise. Preliminary investigations utilizing this approach indicate that discrimination between these cherts is possible. (14)

Spilker, Charles J. (Advisory Council on Historic Preservation) THE ROLE OF THE ADVISORY COUNCIL ON HISTORIC PRESERVATION. One of the responsibilities of the Advisory Council is to assist federal agencies in carrying out their statutory responsibility of protecting archaeological resources. The thrust of preservation legislation is to ensure that archaeological resources are afforded consideration due them within the federal agency decision-making process. The Council's comments are intended as a reasonable solution to a preservation problem in that they are an attempt to reconcile the need for the federal project with the need for the conservation on the archaeological resource base. In this manner archaeological resources can be realistically considered in the federal agency decision-making process. (18)

Spores, Ronald (Vanderbilt) ETHNOGRAPHIC CONTENT OF POSTCONQUEST MIXTEC CODICES. Studies of pictographic manuscripts have emphasized derivation, style, personal and place identification, succession, and chronology. These documents, particularly those containing glosses and/or accompanying documentation, also provide a variety of ethnographic information that may not be found in conventional written sources. A provided, and methods for more adequate and extensive utilization of pictographic sources are suggested. (48)

Stark, Barbara L. (Arizona State) LINEAR NEAREST NEIGHBOR ANALYSIS OF CABEZA DE LA VACA SITES, VERACRUZ, MEXICO. Levee sites are identified through photointerpretation and are mapped from aerial photographs. As linear point patterns they are analyzed for random, clustered, or dispersed distributions using the linear nearest neighbor technique. Dispersion is argued to suggest a degree of contemporaneity of what may have been house locations. (23)

Stark, Barbara L. (see Dahlin, B.) (23)

Stark, Louisa (Wisconsin-Madison) LINGUISTIC EVIDENCE FOR EARLY MIGRATIONS IN SOUTH AMERICA. Recent linguistic studies are used to throw new light on the early peopling of South America. Discussion will revolve around the spread of the Arawakan, Tupi-Guaranian, and Pano-Tacanan languages in the Amazon Basin, as well as of the Yuchi family of languages along the west coast of South America. Correlations between language distribution and archaeological evidence for the prehistory of these areas will be examined. (21)

Steen-McIntyre, Virginia (Idaho) TEPHROCHRONOLOGY (VOLCANIC ASH CHRONOLOGY) AND ITS APPLICATION TO ARCHAEOLOGY. Tephra are fragments of solid material (volcanic glass, crystals, rock) ejected into the air by a volcanic eruption. Tephrochronologists study deposits and samples of these fragments and seek to characterize, correlate, and date them, thereby providing archaeologists who are excavating sites within the area of tephra fall with time-stratigraphic marker horizons for correlation purposes. Tephra from a single eruption may blanket an area of several thousand square kilometers and drastically alter the environment and patterns of human activity. Where remnants of the blanket are preserved, they form a time horizon recognized in sediments as diverse as lake clays and desert dunes. (4)

Stein, Pat H. (Museum of Northern Arizona) RECENT MNA INVESTIGATIONS IN THE LOWER GILA DRAINAGE: NEW DATA ON HOHOKAM SUBSISTENCE STRATEGIES. Studies on Hohokam settlement in the Lower Gila drainage have traditionally focused more on large villages in alluvial plains and surrounding terraces than on smaller sites in secondary resource zones that could have contributed to the support of villages on a seasonal or year-round basis. By focusing on a zone of intensive utilization northwest of Gila Bend, contract investigations near the Palo Verde Hills, Arizona, now suggest that many wild resources were harvested or hunted by the Hohokam at a time when irrigation agriculture and permanent villages were at a peak of development in nearby plains. (51)

Steinen, Karl T. (West Georgia) ARCHAEOLOGICAL INVESTIGATIONS IN EARLY COUNTY, GEORGIA: A SETTLEMENT MODEL FOR KOLOMOKI. Archaeological and ecological relationships in the area of the Kolomoki site, Early County, Georgia. Surface collections and the analysis of private collections indicate that Kolomoki was the only major extremely small ceramic components. This pattern allows for the development of a model of settlement patterning for this area of the Chattahoochee River drainage basin. (53)

Steponaitis, Vincas P. (Michigan) CENTRAL PLACE MODELS IN PRE-MARKET CONTEXTS: A MISSISSIPPIAN EXAMPLE. Christaller's Central Place Theory has been widely applied by archaeologists in recent years. The use of this model is appropriate, however, only in cases where the location of central places are constrained primarily by their function as market centers. Clearly, where central place hierarchies occur in pre-market contexts—as in complex chiefdoms and simple states—a different model is called for. The administrative and tribute relations linking centers in complex chiefdom hierarchies are examined ethnographically. On this basis, a general locational model is formulated and applied to data from the Moundville phase of the Black Warrior River Valley. It is found that the relative locations of chiefdom centers in this archaeologically documented system correspond significantly with the model's predictions. (25)

Sterud, Eugene L. (SUNY-Binghamton) THE DYNAMICS OF EARLY FOOD PRODUCTION IN THE DINARIC REGION OF MEDITERRANEAN EUROPE. This paper examines the beginnings and subsequent changes in the nature of food production in the Dinaric region of Yugoslavia, from the standpoint of historic records, ethnographic and cultural geographical researches, and recent archaeological and faunal studies. A model is presented to account for the changes through time, the applicability of which to Mediterranean Europe generally is argued. (16)

Stevens, Dominique E. (see Hietala, H. J.) (33)

Stewart, Henry (Toronto) THE TRANSITION FROM PALEOLITHIC TO NEOLITHIC IN JAPAN. In Japan, there are several sites that provide a stratigraphical record of a smooth transition from the Paleolithic into the Neolithic. The archaeological record shows a change from large flake tools to microliths, the stage at which there appears evidence that pottery was manufactured. This occurs at the climax of the Final Paleolithic. This paper will attempt to probe the dynamics behind the transition and then make comparisons to models for similar transitions as observed in other parts of the world. Through this comparison, it is hoped to contribute to an understanding of the mechanisms working behind this transition. (54)

Stewart, Marilyn C. (Rollins) ARCHAEOLOGICAL PITS: A RESEARCH DESIGN AND A TYPOLOGY. Archaeological pits are artifacts of human activities and as such can be analyzed by techniques similar to those used for pottery or stone tools. The analysis of form as a basis for space-time and other typologies (e.g., functional and structural) is fundamental. There is an additional dimension to pits, however, in their artifactual contents. These need to be analyzed separately from form, and the two dimensions must be correlated systematically if meaningful statements about function and structure are to be made. The typological method was tested on a sample of 328 pits from a site in New York state, with promising results. (37)

Stinson, Wesley R. (Connecticut) WOODCHUCK KNOTT: SOIL SCIENCE AND ARCHAEOLOGY. Scientific investigation of the soils at the Woodchuck Knoll site have proved themselves to be of great use to future archaeological investigations in the Connecticut River Valley. Having a firm grasp of the time framework for the area resulting from the presence of glacial Lake Hitchcock and from radiocarbon dating of the actual site allows us to investigate the rate of deposition and soil development for this section of the river valley. Upon developing a scale of both we can investigate the potential for use of soils as a valid and important dating technique and can use the soils data in many other collaborative ways. (6)

Stix, A. I. (see Von Endt, D. W.) (44)

Stoltman, James B. (Wisconsin-Madison) OBSERVATIONS AND EXPERIMENTS ON THERMAL PRETREATMENT OF CHERT FROM AN EARLY ARCHAIC QUARRY-WORKSHOP IN SOUTHWESTERN WISCONSIN. Surface collections and excavations at an Early Archaic (Hardin) quarry-workshop in southwestern Wisconsin produced vast quantities of tan chert debitage, with high percentages of red and gray flakes also present. Examination of the same cherts *in situ* revealed no evidence of such color variation, suggesting the possibility of intentional thermal pretreatment. A series of controlled experiments were conducted in which nonartifactual cherts were subjected to varying temperatures for varying durations to ascertain what physical alterations were produced. The positive results of these experiments are summarized in this paper and their implications for interpreting quarry-workshop behavior are explored. (14)

Stone, Doris (Peabody Museum, Harvard) THE POSSIBLE ROOTS OF ROSALES ZONED ENGRAVED WARE FROM THE GREATER NICoya REGION: AN HYPOTHESIS. Precolumbian Ecuadorian merchant marines, particularly from the Guayaquil Gulf, using ocean-going rafts, appear responsible for the introduction of a ceramic ware, Rosales Zoned Engraved, during the Zoned Bichrome period in Greater Nicoya. The artistic tradition characteristic of this pottery seems to come from the southern continent, despite some indications of mixed cultural concepts. The association of Chara and Pococi Islands in the Nicoya Gulf with rafts and a different language on Chara suggests ports of call inhabited by foreigners. The bays of Tamarindo, Culebra, and Santa Elena probably also served as anchorages with Santa Elena the port for Rivas and Lake Nicaragua. (28)

Stothert, Karen E. (Fordham) STYLES AND SETTLEMENTS OF THE EH-EIP TRANSITION ON THE CENTRAL COAST. Based on newly excavated data, a revised culture sequence is described for the end of the Early horizon and the beginning of the Early Intermediate period on the Central Coast of Peru. Chronological arguments are based on the analysis of ceramic styles, while other data are used to interpret the political and economic conditions of the period. New light is shed on the Ventanilla style and settlements at the end of the Early horizon and the newly discovered Villa Salvador style and occupation at the early phases of the Early Intermediate period in the lower Lurin Valley. Culture change is outlined for this period, and the conditions antecedent to the development of complex society later in the Early Intermediate period are tentatively identified. (39)

Stoutamire, James W. (Florida State) INTRODUCTION TO THE HISTORY OF RESEARCH IN THE VIRGIN ISLANDS NATIONAL PARK. Several different archaeological

investigations have been conducted in the Virgin Islands National Park during the last few years. In 1964 water-line and power-line trenches were dug revealing historic and aboriginal materials which were collected by the Park staff. Survey and excavation in the Cinnamon Bay area was conducted by Edward Rutsch in 1969 and 1970. The Southeast Archeological Center, National Park Service, conducted survey and excavations throughout the Park in 1976. Each of these projects has contributed significant new information about the archaeology of St. John. SUMMARY OF VIRGIN ISLAND ARCHAEOLOGY AND RECOMMENDATIONS FOR FUTURE RESEARCH. The archaeological evidence from the Virgin Islands National Park indicates that the aboriginal population clustered on the north shore of St. John. The ceramics are consistent with a South American origin of the aboriginal population and are sortable into types based on paste, vessel form, and surface treatment. Aboriginal occupations included farming, hunting of rodents, inshore fishing and trapping, and shellfish gathering. Historic remains reflect the Danish and African slave occupation of the island. Additional work is necessary, especially to determine seasonality in the aboriginal economy. (12)

Stroh, Edward G., Jr. (Missouri-Columbia) CAN THE SPATIAL DISTRIBUTION OF UTILITARIAN GROUND STONE BE USED TO IDENTIFY KITCHEN AREAS? A TEST CASE INVOLVING TULA, HIDALGO, MEXICO. Food preparation areas are often assigned in Mesoamerican residential archaeology on rather meager evidence. The mere presence of a burned area, or certain ground stone artifacts, and/or cooking wares is often considered sufficient evidence for making such a functional assignment. Little detailed analysis has been done to determine if utilitarian stone implements actually do form a distinct tool kit after deposition, which can be used to define such a spatially distinct activity area. Data is here presented for the Postclassic site of Tula, which demonstrates that manos, metates, and pestles indeed do show a propensity to occur together in certain rooms of the site. Criteria are presented for maximizing the probability of correct kitchen identification. Finally, some hypotheses concerning the social organization of the ancient city are presented. (34)

Stuckenrath, R. (see Adovasio, J. M.) (6)

Sugiura, Yoko (see Serra, M. C.) (2)

Sutro, Livingston D. (see Wilk, R. R.) (55)

Sutton, Mark Q. (see Eggers, A. V.) (45)

Tainter, Joseph A. (New Mexico) WOODLAND SOCIAL AND ECONOMIC SYSTEMS IN WEST-CENTRAL ILLINOIS. The problem of Middle to Late Woodland social and economic change has been one of the most difficult areas of interpretation confronting Midwestern archaeologists. Data from the Illinois Valley indicate that change in the Late Woodland period involved increases in population, use of marginal resource zones, subsistence intensification, competition and conflict, and changes in the nature of social systems. These variables form an interrelated set of conditions, which influenced the emergence of complex Mississippian cultural systems. (17)

Thoms, Alston (Texas Tech) RESEARCH DESIGN—THEORETICAL UNIFORMITY, CLARIFICATION, OR STAGNATION? Recent trends toward research uniformity (by requirements) are presented as an example of a positive trend toward clarification of and potential agreement on research goals and objectives in U.S. archaeology. The concomitant hazards to creative scholarship are indicated in a statement of renewed concern about the relationship between "directed," or applied research, and basic, or "pure" research. (26)

Thomson, James W. (NPS) RECENT NATIONAL PARK SERVICE ARCHAEOLOGICAL RESEARCH IN THE VIRGIN ISLANDS NATIONAL PARK. In February and March of 1976, the Southeast Archeological Center, National Park Service, conducted a survey of the cultural resources of the Virgin Islands National Park. The purpose of this survey was to scrutinize 12 proposed areas for possible landfill use and to execute a total cultural inventory of the Park area to present to Park personnel for visitor interpretive purposes. The survey and limited excavations supplement and support the results of earlier archaeological investigations with respect to site types and environmental location. (12)

Thomson, James W. (see Hays, T. R.) (19)

Tippeconnic, Robert (USDA Forest Service) CULTURAL RESOURCES AND LAND-USE PLANNING: THE LAND MANAGER'S PERSPECTIVE. Land management in a multiple-use framework requires data on all resources present over a given parcel of land including the cultural resource. Incorporating cultural resource information at the land-use planning level provides the land manager with a valuable tool for assessing the implication of the occurrence of cultural resources on other resources. He is better able to assess the impact on project level work and design strategies for both cost effective as well as wise use of the entire resource base. (50)

Townsend, Joan B. (Manitoba) ETHNOARCHAEOLOGY: PERSPECTIVES FROM THE NORTH AMERICAN SUB-ARCTIC. Ethnoarchaeology in the Alaskan and Canadian Sub-Arctic is examined through a historical critique of the interrelations developed in

ethnography and archaeology and their usefulness as tools for historic and prehistoric analysis. Special emphasis is directed to Athapaskan studies and the time period from 1950 to the present. Suggestions and cautions derived from historic and ethnographic studies and anthropological theory are made concerning ethnoarchaeological interpretations. (32)

Tringham, Ruth E. (Harvard) RESOURCE UTILIZATION IN NEOLITHIC YUGOSLAVIA. The paper will discuss recent information on the changing pattern of resource utilization from the early Neolithic to the late Neolithic in Yugoslavia. This information is provided by the lithic analyses from a number of Neolithic sites in southeast Europe, covering technological, functional, and stylistic aspects of the stone tools. It is also provided by the preliminary results of the excavations of the early Vinca-Plocnik site of Selevac in central Serbia, Yugoslavia. The process of the growth in the range of resources exploited, the distance from which they were procured, and the scale and regularity of their exploitation during this period will be examined. The relation of this growth to the establishment of fully sedentary societies and a productive agricultural economy will be discussed. The process will be compared to similar situations in other parts of southeastern and Mediterranean Europe. (16)

Troike, Nancy P. (Texas-Austin) RULERSHIP CEREMONIES IN THE MIXTEC CODICES. Several ceremonies shown in the Mixtec codices appear to be associated with the selection and inauguration of new rulers. This paper will present the results of a systematic examination of these occurrences in both Pre- and Posthispanic Mixtec pictorial manuscripts, including data on the genealogical background of the persons involved, the historical events surrounding each case, the sequences of the ritual activities, the objects used, and the sites at which the events were conducted. It will be shown that there are several distinct clusters of ceremonies and that each occurs only under specific historical circumstances. (48)

Ulrich, Thomas (see Green, S. W.) (5)

Valastro, S., Jr. (see Davis, E. M.) (19)

Valastro, S., Jr. (see Lambert, P. W.) (4)

Van Allsburg, John (Michigan State) FOURIER SHAPE ANALYSIS OF MOUSTERIAN AND UPPER PALEOLITHIC TOOLS FROM PETRIOLLO II, ITALY. Fourier series shape equations provide a method for analyzing artifact shapes as single attributes, and for comparison and classification of artifacts according to degree of relationship in shape within a dendritic hierarchy. This method is applied to a collection of jasper artifacts from Petriolo II, a Middle/Upper Paleolithic open air station 20 km south of Siena, Tuscany, Italy. It tests the proposition that the occupation is transitional between Upper Paleolithic and Mousterian by examining the implication that if only one occupation is present, shape distinctions should separate functionally discrete types while joining functionally similar types. Analysis of some published artifact illustrations will be used to reflect on differences between the Mousterian and the Upper Paleolithic. (7)

Van Der Leeuw, S. E. (Amsterdam and Michigan) ETHNOARCHAEOLOGY OF ANDEAN SOUTH AMERICA: EUROPEAN AND AMERICAN VIEWS. The two authors will present contrasting European and American views on the problem of ethnoarchaeological studies of the Andean South American region. Ceramic studies, in particular, will be stressed. (32)

Van Der Leeuw, S. E. (see Watson, P. J.) (24)

Van Devender, Thomas R. (Arizona) LATE HOLOCENE VEGETATIONAL TRANSITION IN ROCKY ARROYO AND LAST CHANCE CANYON, EDDY COUNTY, NEW MEXICO. Indurated packrat (*Neotoma*) middens from Rocky Arroyo and Last Chance Canyon (1130-1310 m elevation, limestone), Eddy County, New Mexico, record past vegetation. Macrofossils in late Pleistocene middens (RAI:  $10,560 \pm 150$  B.P. on *Juniperus*, A-1648) are mostly woodland species (*Artemisia*, *Quercus*, *Juniperus*, *Rhus*, *Celtis*, *Fallugia*); Holocene samples contain more desert plants (*Agave*, *Dasytilirion*, *Nolina*, *Opuntia*, *Prosopis*). Late Pleistocene middens contain more *Artemisia*, *Quercus*, *Pinus*, and especially, low-spine *Compositae* and grass pollen; Holocene samples contain more cheno-am pollen. The fossils record a transition from a juniper-oak woodland with abundant grass, to a Chihuahuan desert scrub with persistent juniper and oak. (27)

van Hartesveldt, Eric N. (Missouri-Columbia) ZIPF RECONSIDERED: A REPLICATION OF THE RANK-SIZE MODEL. The validity of the Rank-Size (lognormal) rule is questioned. Previous tests concerning the validity are examined: the size of the sample used was inappropriate; the application of a statistical measure of goodness of fit was lacking; and definitions of homogeneous and heterogeneous as originally applied to this model were misused. This analysis employed all 3,163 cities used in Zipf's original study, the original definitions of homogeneous and heterogeneous were accepted, and a Chi-square test for goodness of fit resulted in the rejection of the model. However, since lognormal transformation of the "expected" data was originally employed, the data was similarly transformed for this study, a regression line was fitted to it and a correlation analysis was performed. The original results were then more nearly approximated. (52)

Varela, Alejandra V. (see Davis, E. M.) (19)

Vega, Constanza (INAH) CERAMIC STRATIGRAPHY IN THE SACRED PRECINCT OF TENOCHTITLAN. Recent work carried out by the Mexican government to consolidate the foundations of the Metropolitan Cathedral provides new data on ancient Tenochtitlan. The present ceramic sequence is the result of this project and a stratigraphic pit made in the east garden of the Cathedral. Results of obsidian hydration tests will also be reported. (2)

Velasco, Margarita (see Brambila, R.) (2)

Veliz R., Vito (Instituto Hondureño de Antropología e Historia) ANCIENT HUMAN FOOTPRINTS IN GUAIMACA, HONDURAS. Atop the summit, and near the ground surface, of a pine-clad hill in central Honduras, research by the Instituto Hondureño de Antropología e Historia has revealed evidence of human footprints embedded in volcanic rock of presently undetermined geologic age. Three footprints are clearly distinguishable while others are less visible. No artifacts have yet been found in association with the find. In many respects the site is similar to footprint localities in both El Salvador and Nicaragua. (36)

Vicek, David T. (see Allen, R. K.) (31)

Vokes, Arthur (Arizona) SHELLING OUT: THE ROLE OF MOLLUSKS IN A POST-CLASSIC MAYA ECONOMY. The island of Cozumel, lying off the northeastern coast of the Yucatan Peninsula, was the location of a joint University of Arizona and Harvard University survey and excavation program between 1972 and 1974. Analysis of shell artifacts and debitage was undertaken to answer questions concerning resource use, manufacturing patterns, and social patterns. It is felt that shell, being one of the few natural resources that was available locally and in quantity, would reflect the intraisland economic structure, thereby giving insight into the interrelationships between the numerous small coastal sites and their larger inland counterpart. (55)

Von Endt, D. W. (Smithsonian) ENVIRONMENTAL FACTORS THAT AFFECT THE PRESERVATION OF BONE IN FAUNAL ASSEMBLAGES. It is well known that buried bone disintegrates over archaeologically significant periods of time. However, little is known concerning the actual mechanism of this process. Even less is known about the specific manner by which environmental conditions affect the rate at which deterioration occurs. We have conducted laboratory experiments designed to simulate two environmental factors affecting bone deterioration in the field. In the first set of experiments we determined that bone of a given size releases nitrogen (which reflects protein loss) at a rate dependent on temperature. If size of bone is varied and temperature is held constant, bone protein hydrolysis proceeds at a rate inversely proportional to the size of the bone. In both experiments there is also selective loss of protein moieties indicated by a change in amino acid composition during the experiment. The protein remaining in bone at the end of the simulation experiment thus differs from its original composition. These data are presented individually in order to isolate and quantitate the effect of specific environmental variables responsible for degradation of bone. While recognizing that other variables such as soil pH and water volume also affect bone degradation, we have assembled the data obtained thus far in nomograph-like form to further correlate the two variables and their combined effect on the rate at which degradation occurs. (44)

Voorhies, Barbara (Museo Nacional de Antropología, Mexico) PROTOCLASSIC SETTLEMENT PATTERN IN THE UPPER MOST GRIJALVA BASIN. Recent investigations in the uppermost Grijalva Basin, Chiapas, Mexico, have focused on dramatic settlement pattern transformations between the Protoclassic period and preceding and succeeding periods. In contrast, in the Protoclassic period regional settlement was dominated by a single large site. In objective of my research is to identify the causes of these transformations. (34)

Voss, Jerome A. (Michigan) STYLISTIC ANALYSIS AND ORGANIZATIONAL CHANGE: A EUROPEAN EXAMPLE. A study of change in intersite stylistic variability of pottery assemblages has permitted the evaluation of a model of social organizational change in egalitarian societies. The data set consists of pottery assemblages from the megalithic tombs of the Neolithic Western TRB (Funnel-Beaker Culture) in the Netherlands and northwestern Germany. Ready control of pot function and site function, temporal control of stylistic attributes, and the fact that the assemblages consist of highly decorated pots, all contribute to the suitability of the data set for the consideration of changing patterns of regional stylistic variability. The results of the study and the potential of stylistic analysis for the study of organizational change are discussed. (40)

Wagner, Erika (Instituto Venezolano de Investigaciones Científicas) THE MARACAIBO BASIN. This paper attempts to present a synthesis of the prehistory of the Maracaibo Basin and to show that this vast area participates in both the ecological and cultural complexity of northern South America. Emphasis will be placed on the significance of such early ceramic sites as Rancho Peludo, La Pitía, and Lagunillas. (8)

Wallace, Dwight T. (SUNY-Albany) A LATE CEREMONIAL ROAD SYSTEM IN CHINCHA: SYMBOLIC AND POLITICAL IMPLICATIONS. A series of roads of late date in the Chincha Valley is open to interpretation at two levels. At one level, their regular and geometric lay-out indicates a possible ritual or symbolic function, one focus being the oracular center of La Centinela. At a second level, the road system may also have served for

external and internal communication, linking a series of ep-choritic and choritic sites into a system which would be commensurate with the level of state organization implied by the documents for Chincha, but not suggested by population centralization or site size. The layout of the network, with one arm leading to the up-river road, another to the upper Pisco Valley, and a third toward the lower Pisco and Paracas area, and the occurrence of various late sites directly along the road network would be evidence for such a system. (49)

Wallace, Ilene (Cornell) POLYCHROME CERAMICS IN THE VALLE DE NACO AND THEIR EXTERNAL RELATIONSHIPS. This paper presents a new approach to analyzing Classic Maya and related ceramic complexes. This method involves a synthesis of modal and type-variety analyses, directed toward comparisons of designs and design elements, focusing on polychrome ceramics. This is a separate analytical procedure from our technologically based typology, which is used for analyses of ceramics within our local area. This design-oriented approach produces a new understanding of cultural contacts within eastern Mesoamerica and relationships between Maya and so-called "mayoid" polychrome pottery. (36)

Ware, John A. (see Chandler, S. M.) (14)

Watson, Patty Jo (Washington) ETHNOARCHAEOLOGY IN THE NEAR EAST. There is considerable interest in ethnoarchaeological research in the Near East at the present time, with a variety of studies completed or underway in Cyprus, Turkey, Iran, and Israel; but with the exceptions of Frank Hole's observations on the Iranian Baharvand sheep/goat nomads, and Shutler and Seger's study of patterning of material remains in Bedouin villages these studies are all focused on village dwelling peasants because the archaeologists involved are concerned with prehistoric (early food-producing) villages. In this paper I present a brief summary of current ethnoarchaeological work in western Asia and the Levant as well as references to relevant but more traditional ethnographic studies. Comparative facts and figures drawn from a few of the most recent ethnoarchaeological investigations of contemporary villages are also provided. (24)

Weigand, Phil C. (SUNY-Stony Brook) ATITLAN-LAS CUEVAS: A POSTCLASSIC PORT-OF-TRADE IN THE HIGHLANDS OF WESTERN MEXICO. The Atitlan-Las Cuevas site is located on a former island in the municipio of Antonio Escobedo, Jalisco. The semi-fortified site is characterized by a relatively complex ceremonial center, a possible ball court, terraces, dense occupation zones, a large cemetery, excavated "caves" at the ancient shore line, obsidian outcrops and quarries, and a massive obsidian workshop. Ceramics of origins outside the region characterize much of the sherd cover. Most imported ceramics appear to be coming from the west coast, but a small quantity of Largo Glaze on Yellow (New Mexico) attest to contacts even further afield. It is postulated that control over high quality obsidians and the ability to mass produce large quantities of blades allowed the site to specialize as a port-of-trade. (34)

Weigand, Phil C. (see Arnold, D.) (32)

Weigand, Phil C. (see Shadow, R. D.) (34)

Wessen, Gary C. (Washington State) BONE STRONTIUM AND BARIUM CONTENT AS INDICATORS OF DIET AND ENVIRONMENT. Neutron activation analysis of the calcium, strontium, and barium content of over 350 samples of recent and archaeological bone suggests that patterned relationships in the concentrations of these elements do exist, and that such relationships may be utilized as a basis for the investigation of problems concerning prehistoric economy and technology. Barium content and, to a lesser extent, strontium content appear to reflect the local environmental availability of these elements and thus may be employed to establish the source of morphologically indistinct bone (i.e., bone artifacts). Concentrations of these elements appear to be subject to postmortem alterations in at least some depositional environments. Other researchers have suggested that strontium is a sensitive indicator of diet and trophic position; however, the present study does not support this view. (44)

Weymouth, John W. (Nebraska) A MAGNETOMETER SURVEY OF SAKAKAWEA VILLAGE EARTH LODGES. The Knife River Indian Villages National Historic Site includes five prehistoric and historic Plains village tradition sites. As part of an archaeological assessment of this area, an extensive proton magnetometer survey was conducted for the National Park Service over various regions in the site in 1976. An analysis will be presented of one of the regions, the Sakakawea Village. During four days 4,200 square meters were surveyed. The results will be compared with an elevation map of the visible house depressions. Ten obvious house depressions were confirmed, eight further houses not obvious from visual inspection were indicated, and at least one house clearly indicated by the survey had no visible depression at all. (29)

Whalen, Michael E. (Texas-EI Paso) ASPECTS OF THE PITHOUSE-TO-PUEBLO TRANSITION ON THE PERIPHERY OF THE AMERICAN SOUTHWEST. Large-scale settlement pattern data is analyzed in consideration of some of the dimensions of the transition from pithouses to pueblos on the eastern periphery of the Southwest. The study views cultures as open, adaptive systems exchanging matter, energy, and information with their environments. Individual sites are thus components of the adaptive strategies within which these exchanges are made. Attention is given to processes of change in these adaptive strategies.

Specific processes of change are: increasing numbers of parts of the settlement system, and increasing specialization, differentiation, and integration of these parts. (41)

Wheat, Joe Ben (Colorado-Boulder) BONE TECHNOLOGY AT JURGENS, OLSEN-CHUBBUCK, AND LITTLE BOX ELDER CAVE. Bone was a common material for the production of both formalized and impromptu tools at the Jurgens site. The manufacture of formalized bone artifacts was carried out with the use of stone tools, while impromptu tools were produced primarily by controlled breakage. Percussion flaking and grinding were used to perfect or resharpen bone tools. Some tools retained articulated handles. Degree of use of bone tools varied from locality to locality depending in part on presence of stone tools of same usage. The selection of bones for impromptu tools varied between the three localities in the site. The Olsen-Chubbuck site produced one formal bone needle, but the use of impromptu tools was minimal. Little Box Elder Cave, which contains a Pre-Clovis Rancho Equus compresidens by controlled breakage. (13)

Whittaker, Gordon (Yale) FROM ZAPOTEC HIEROGLYPHICS TO THE MIXTEC CODICES. The Mixtec scribal tradition has long been held to be an outgrowth of the Zapotec. From the earliest inscriptions of Monte Alban to the Mixtec-derived codices of style of glyptic and iconographic composition. This paper will endeavor to place the Mixtec codex in its historical perspective by tracing the stages in its evolution from Danzante and Conquest tablet sequences through later Zapotec stelae and the panelled slabs of the Late Classic. The devolution from formal hieroglyphic to predominantly iconographic content, a Mesoamerican phenomenon without known parallel, will also be discussed. (48)

Whittlesey, Julian (Whittlesey Foundation) LOW-LEVEL AERIAL PHOTO PLATFORMS FOR RECORDING AND REMOTE SENSING IN ARCHAEOLOGY. The paper will illustrate with slides and diagrams the author's systems used in the last ten years on over 50 sites in some 12 countries, including the United States, Mediterranean, Middle East, Europe, and England. The use of unmanned tethered balloons, air foils, and bipod camera supports will be shown for recording over-land and underwater sites. Recommendations will be given for the application of these techniques for recording and remote sensing over sites typical of Mesoamerica. The work described is being currently put into the field by teams equipped and trained by the Whittlesey Foundation, Inc. The Foundation offers to help equip and train others to carry on similar operations in their areas. (31)

Whittlesey, Stephanie M. (Arizona) STATUS AND DEATH AT GRASSHOPPER PUEBLO: A THEORETICAL EXCURSION. Much attention has been focused on problems of inferring past behavior from material remains. Most crucial is the development of a tool kit adequate for such aims. One important aspect is how past variables of interest may be successfully measured. Human burials and associated artifacts from the Grasshopper Pueblo are used as a vehicle for assessing the construction of a theory useful for the inference of complex behaviors. Archaeological measurement of systems of status differentiation is discussed in light of these theoretical considerations. (51)

Wildesen, Leslie E. (USDA Forest Service) A CASE STUDY OF THE BADGER-JORDAN PLANNING UNIT, MT. HOOD NATIONAL FOREST, OREGON. Ethnographic, historical, and interview data were compiled by a three-member team in June 1976 to create a cultural resource overview for a little known area on the east flank of Mt. Hood. This brief study revealed 20 previously undocumented sites, both historic and prehistoric, and enabled predictions of future impacts on cultural resources to be used in weighing alternative land allocations during land-use planning. (50)

Wilk, Richard R. (Arizona) "TAKING THE PLUNGE," ESTIMATING POPULATION AT TIKAL ON THE BASIS OF WATER RESOURCES. Food consumption and production has been a matter of topical concern lately, but the means by which prehistoric peoples procured water has been neglected. At Tikal the availability of water is circumscribed by a seasonal rainfall pattern. By estimating reservoir capacity, evaporation rates, and consumption rates, it is possible to specify a range for maximum dry season population at the site. This range, compared with previous estimates, reflects both upon standard population calculation methods and upon the possible role of water resources in limiting population growth at the site. The implications for settlement patterning are also explored. (55)

Williams-Dean, Glenna (Texas A&M) INVESTIGATIONS INTO THE ETHNOBOTANY AND CULTURAL ECOLOGY OF PREHISTORIC MAN IN THE LOWER PECOS. Continuing analysis of a large sample of coprolites from a single depositional layer at Hinds Cave allows general statements to be made on aspects of Archaic daily life 6,000 years ago. The conclusions are drawn from palynological, parasitological, and botanical coprolite evidence. (35)

Wilson, Robert T. (see Allen, R. K.) (31)

Windmiller, Ric (see Eddy, F. W.) (19)

Wing, Elizabeth S. (Florida State Museum) DISPERSAL OF NATIVE DOMESTIC ANIMALS IN NORTHWESTERN SOUTH AMERICA. Studies of faunal samples from Peru and Ecuador are beginning to reveal an outline of the sequence of events in the origin and

dispersal of domestic animals in northwestern South America. The major domesticates under consideration are two camelids, llama and alpaca, and guinea pig. Evidence for two patterns of dispersal have emerged. Guinea pigs appear to have become domesticated in two areas, the highland valleys of central Peru and Colombia. Dispersal of guinea pigs to the Peruvian coast may have been as early as 2000 B.C., but they never became abundant. Dispersal into the highlands of Ecuador, into Venezuela and Caribbean Islands occurred between A.D. 800 and time of contact. Llamas and alpacas were first domesticated in the Puna region of the Central Highlands of Peru. Use of these animals spread early, about 3000 B.C., to the highland valleys. Dispersal to the coast of Peru was about 2,000 years later. Spread in their use did not extend much beyond northern Ecuador where they are not found until about A.D. 750. Dispersal south into Chile, Bolivia, and Argentina is not precisely known. (30)

Wood, Jon Scott (Arizona State) LAND-USE PLANNING AND REGIONAL RESEARCH POTENTIAL: THE APACHE-SITGREAVES EXAMPLE. During the past five years, members of the Chevelon Archeological Research Project have collected data on archaeological sites on the Apache-Sitgreaves National Forests, Arizona. Some of these data were gathered in the context of a preliminary cultural resource assessment for the purposes of land-use planning. Some data were gathered for "pure" research purposes. Similarities in the techniques of data collection and of data analyses in the "pure" research and the land-use studies are identified. The range of archaeological problems that can be pursued using these data bases is described. A critical question that arises from the land-use studies concerns the kinds of questions that can be answered on the basis of low-fraction survey samples. Responses to a series of questions employing successively large data bases are described. (50)

Workman, William B. (Alaska) THE SIGNIFICANCE OF VOLCANISM IN THE PRE-HISTORY OF SUBARCTIC NORTHWEST NORTH AMERICA. Cultural and environmental information will be brought to bear on the problem of the impact of past volcanism on the native cultures of northwestern Canada and the eastern Aleutian Islands. Events to be compared are the emplacement of the east lobe of the White River Ash ca. 1250 B.P. and several volcanic eruptions of historic and prehistoric times in the eastern Aleutians. We conclude that relatively frequent volcanic eruptions probably had only localized if sometimes drastic consequences for maritime North Pacific hunting peoples while much rarer volcanic events in the more sparsely populated boreal interior may well have had more far-reaching significance. (4)

Wyckoff, Don G. (see Brown, J. A.) (25)

Yesner, David R. (Alaska-Anchorage) METHODS FOR ANALYZING PREHISTORIC BIOTIC POTENTIAL AND RESOURCE EXPLOITATION. Most human paleoecological research is presently being undertaken in a theoretical vacuum. There is an urgent need to systematize research procedures so that all major variables relating to human-environmental relationships are considered in each region of study. To this end, ten basic features of all natural populations are considered, and archaeological methods appropriate to analyzing the effects of, and human effects on, each feature are presented. Illustrative data are drawn from recent faunal studies in southwestern Alaska. (5)

Yoffee, Norman (Arizona) THE DECLINE AND RISE OF MESOPOTAMIAN CIVILIZATION: AN ETHNOARCHEOLOGICAL PERSPECTIVE ON THE EVOLUTION OF SOCIAL COMPLEXITY. Recent literature on the rise of civilization, both world-wide and area-specific, reflects near unanimity in sharing a conceptual paradigm of social evolution. Little progress seems to have been made, however, in developing tools to measure the differences between simpler and more complex societies and in appraising the internal mechanisms of social change. It is argued that the evolutionist paradigm has deflected archaeologists from their goals. Examples of factors in the collapse of Mesopotamian civilization are cited in order to better formulate the issues with which archaeologists need to deal in approaching the dynamics involved in the rise of civilization. (20)

Young, Dennis (see Stark, B. L.) (23)

Zamecnik, Elena Decima (see Richardson, J. B., III) (30)

Zeidler, James A. (Illinois-Urbana) EARLY FORMATIVE SETTLEMENT IN THE CHANDUY VALLEY, SOUTHWEST ECUADOR. This paper presents findings of recent reconnaissance work carried out in the Chanduy Valley in conjunction with the Real Alto Archaeological Project. A total of 49 Early Formative sites have been located within a geographical "survey" area measuring roughly 600 sq km. After considering certain limitations of the survey methodology, the distribution of Valdivia and Machalilla sites is discussed in terms of a linear pattern of riverside settlement by which alluvial bottomland was progressively controlled for agricultural purposes. (9)

Zevallos, C. (Universidad Estadal de Guayaquil) NUEVAS EXCAVACIONES EN CERRO SENTINELA. A further analysis of the Cerro Sentinel chronology. Centinela is an Early Valdivia settlement 32 km inland from the nearest seashore over the ample floodplain of the Azucar River and gives further evidence of the agricultural orientation of the Valdivia people. (9)

Zubrow, Ezra B. W. (Stanford) SIMULATION AND THE APPLICATION OF A KRIGING SAMPLING DESIGN TO REGIONAL SURVEY. This paper uses "Kriging," a type of sampling theory, to interpolate archaeological information in an area in which no sampling has been done. The methodology is based upon the theory of regional variables. In order to test the validity of the technique, a simulation of results is developed. The results of the Kriging simulation survey are then compared to real data. (15)

Zucchi, Alberta (Instituto Venezolano de Investigaciones Cientificas) ECOLOGICAL VARIABILITY AND PREHISPANIC AGRICULTURE IN THE VENEZUELAN LLANOS. Based on recent research in the western Venezuelan llanos and along the Middle Orinoco the paper discussed the ecological variability of the area in relation to Prehispanic settlement and subsistence systems. Within this framework special emphasis will be given to the intensification of agriculture as indicated by ridged fields and its relationship to the Araquinooid population growth and successive expansive movements. (22)

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