

MARQUARDT

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Program and Abstracts

SOCIETY FOR
AMERICAN ARCHAEOLOGY

FORTY-THIRD ANNUAL MEETING

Tucson, Arizona

4-6 May 1978

GENERAL INFORMATION

Forty-Third Annual Meeting SOCIETY FOR AMERICAN ARCHAEOLOGY

Program Chair: Dee Ann Story

Program Committee: Margaret J. Kluge, Elton R. Prewitt, Nancy P. Troike, Richard P. Watson

OFFICERS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY

President: Cynthia Irwin-Williams

President-elect: Fred Wendorf

Secretary: Alfred E. Johnson

Treasurer: Jeffrey S. Dean

Editor: Frank Hole

Editor-elect: Jeremy A. Sabloff

Executive Committee

Members: Margaret M. Lyneis and William Fitzhugh (to 1978), George F. MacDonald and William D. Lipe (to 1979)

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 concourse lobby, or may be ordered prepaid from the Society, 1703 New Hampshire Avenue, NW, Washington, DC 20009.

Business Meeting The Society's annual business meeting will begin at 5:45 pm in the Community Center Music Hall.

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

Exhibits Publishers' book exhibits will be displayed in the Cochise Room from 4 pm to 8 pm on 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 concourse lobby during the registration hours for those who wish to purchase publications or enroll in the Society.

Message Center A self-service message center will be located in the registration area. This center should not be used for messages pertaining to the placement service.

National Endowment for the Humanities representatives—Glenn Long of the Museums and Historical Organizations Program and staff members from the Endowment's Division of Public Programs—will be present at the annual meeting to discuss historic site interpretation and museum programs with interested archaeologists. Times and places of their availability for consultation will be posted on the message board.

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 the Coconino Room.

Open House Everyone is invited to the open reception (cash bar) on Thursday at 6 pm in the concourse lobby.

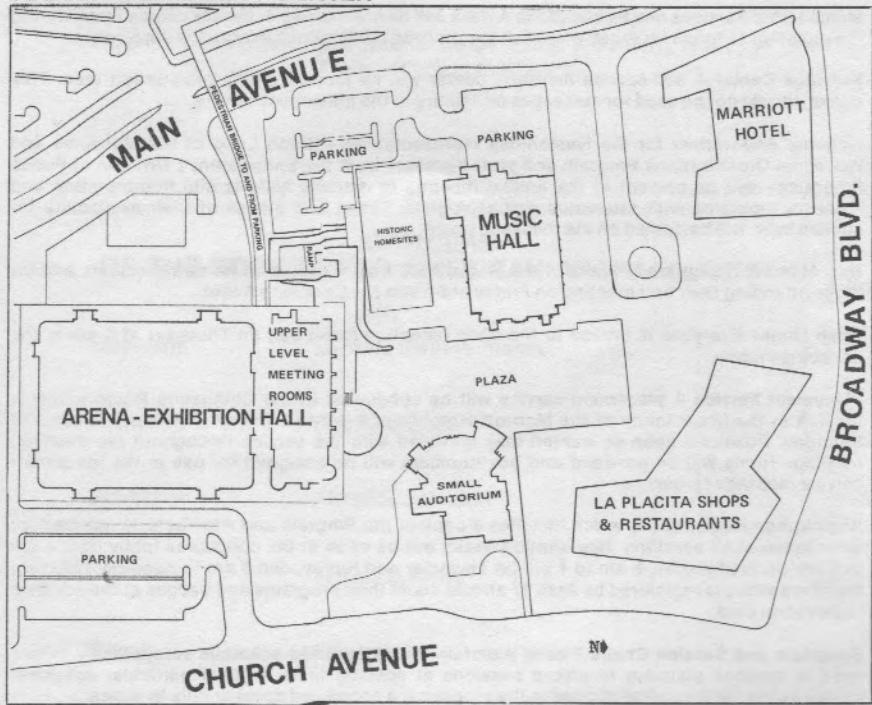
Placement Service A placement service will be conducted in the Chihuahua Room which is located in the lower lobby of the Marriott Hotel from 9 am to 5 pm on Thursday, Friday and Saturday. Positions open or wanted may be listed with the service throughout the meeting. Message forms will be provided and 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 concourse lobby from 4 pm to 8 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 17 should claim their programs and badges at the advance registration desk.

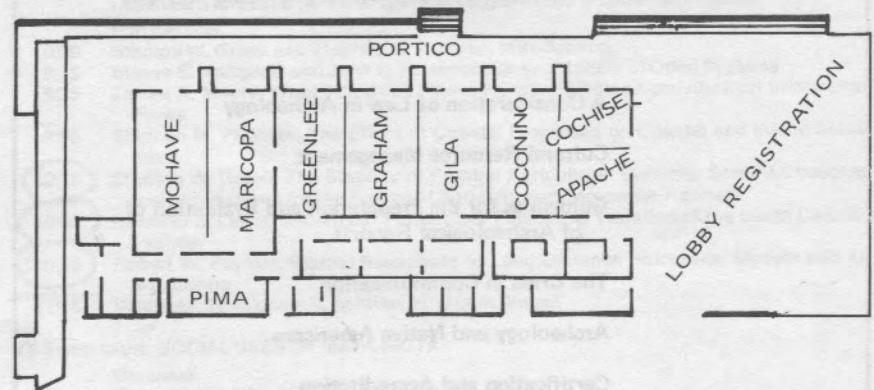
Symposia and Session Chairs Please maintain the established schedule scrupulously in fairness to persons planning to attend sessions at specific times to hear particular speakers; please pause for the period allotted in the program if a scheduled speaker fails to appear.

Floor plans of the exhibition hall meeting rooms and of the community center appear on the next pages.

TUCSON COMMUNITY CENTER



MEETING ROOMS, CONCOURSE LEVEL, EXHIBITION HALL



The MANAGEMENT of ARCHEOLOGICAL RESOURCES

THE AIRLIE HOUSE REPORT

edited by Charles R. McGimsey III and Hester A. Davis

A Consideration of Law in Archeology

Cultural Resource Management

Guidelines for the Preparation and Evaluation of
Archeological Reports

The Crisis in Communication

Archeology and Native Americans

Certification and Accreditation

*A special publication of the Society for American Archaeology,
available from SAA Publications, 1703 New Hampshire Av NW,
Washington, DC 20009. \$3.00 per copy, prepaid.*

PROGRAM

THURSDAY MORNING, MAY 4

(1) Symposium: CHANGE AND INTERACTION IN THE HOHOKAM CORE AREA

Mohave
Organizer and Chairperson: Fred Plog

Participants:

- 9:00 Fred Plog, The Nature of Hohokam Cultural Change
9:20 David E. Doyel, Hohokam Social Organization and the Sedentary to Classic Transition
9:40 Carroll L. Riley, The Impact of Mesoamerican Interaction on Hohokam Culture
Change
10:00 Discussants: J. Charles Kelley, Martin E. McAllister
10:30 Robert E. Gasser, Exchange in Hohokam Subsistence Practices
10:50 Steadman Upham and Glen Rice, Up the Canal Without a Pattern: Modelling Hohokam Interaction and Exchange
11:10 Discussants: Stephen Plog, Emil Haury
11:45 Discussion

(2) Symposium: FRONTIER SYSTEMS AND BOUNDARY PROCESSES: AN APPROACH TO INTER-REGIONAL ANALYSIS

* Maricopa
Organizers and Chairpersons: Stanton W. Green and Stephen M. Perlman

Participants:

- 9:00 Stanton W. Green and Stephen M. Perlman, Introduction
9:15 Steven E. Hampson and John S. Justeson, Closed Models of Open Systems
9:35 James A. Moore, What You Don't Know: Hunter-Gatherer/Agriculturalist Information Flows
9:55 Stephen M. Perlman, The Effect of Coastal Processes on Coastal and Inland Settlement
10:15 Stanton W. Green, The Stability of Frontier Agricultural Systems: Some Archaeological Implications for the Spread of Agriculture in Temperate Habitats
10:35 Kenneth E. Lewis, Settlement Pattern and Functional Variation of the South Carolina Frontier
10:55 Robert W. Poyer, Spatial Responses to Long Distance Processes: Models and Assumptions
11:15 Discussants: Michael B. Schiffer, H. Martin Wobst

(3) Symposium: SOCIAL USES OF MAYA BIOTA

Greenlee
Organizer and Chairperson: Mary Pohl

Participants:

- 8:00 Stanley J. Olsen, Special Problems of Faunal Analysis in the Maya Area
8:25 Nancy L. Hamblin and Rea Amadeo, Isla Cozumel Archaeological Avifauna
8:50 Elizabeth S. Wing, Maya Foodways
9:15 Mary Pohl, Fauna as an Indicator of Differential Social Status Among the Ancient Maya
9:40 Hattula Moholy-Nagy, The Uses of Mollusks at Tikal, Guatemala
10:05 Frank P. Saul and Julie Mather Saul, Maya Socioculture and Ecology as Recorded in Their Skeletons
10:30 Arthur W. Vokes, They Don't Make Them Like They Used To
10:55 Howard Savage, Faunal Findings in Cave Sites in Belize
11:20 Linda Schele, The Plants and Animals on the Sarcophagus Sides at Palenque
11:45 Discussant: B. M. Gilbert

(4) Symposium: DIAGNOSTICS OF THE MIDDLE HORIZON IN PERUVIAN ARCHAEOLOGY

Graham
Organizers and Chairpersons: Richard P. Schaedel and James M. Vreeland

Participants:

- 8:30 Richard P. Schaedel, Permanent and Transitory Diagnostics of the Middle Horizon in the Central Andes
8:50 Discussion

- 9:00 James M. Vreeland, The Moche-Huari Cultural Interface: Textile Technology and Iconography of a Slit Tapestry Funerary Garment
Discussion
- 9:30 William J. Conklin, Middle Horizon Textile Techniques
Discussion
- 10:00 Izumi Shimada, Causality of Changes During the Middle Horizon: A North Coastal Perspective
Discussion
- 10:20 Carol J. Mackey, A Re-evaluation of the North Coast Huari Style
Discussion
- 11:00 Jack Smith, Jr., Recuay Iconography and Middle Horizon Styles
Discussion
- 11:20 William H. Isbell, Huari Urban Configurations
Discussion
- 11:30 Katharina J. Schreiber, Planned Architectural Units of the Middle Horizon: Variations on a Theme
Discussion
- 12:20

(5) Symposium: CURRENT THEORY AND RESEARCH IN GREAT BASIN ARCHAEOLOGY

- Gila
Organizers and Chairpersons: D. D. Fowler and Robert L. Bettinger
Participants:
- 8:00 James C. Bard, Great Basin Petroglyphs: Relative Dating by Neutron Activation Analysis
- 8:20 Colin I. Busby, Recent Archaeological Research in Southeastern Nevada: Garden and Coal Valley Region
- 8:40 Susan M. Seck, Larry S. Kobori, and Herbert H. Covert, Recent Archaeological Studies in Southeastern Nevada: Silivovitz Rockshelter
- 9:00 Steve R. James, An Archaeological Reconnaissance in the Upper Reaches of the Black Rock Desert, Northwestern Nevada
- 9:20 Donald K. Grayson, The Gatecliff Shelter Microvertebrates
- 9:40 Trudy Thomas, Microscopic and Stylistic Analysis of Four Hundred Incised Stones from Gatecliff Shelter, Nevada
- 10:00 Robert L. Bettinger, Aboriginal Food Production in Owens Valley, Eastern California
- 10:20 Philip J. Wilke, The "Ancient Stone Fish Traps" of the Salton Basin, California
- 10:40 David Hurst Thomas and Robert Kelly, A Preliminary Report on Paleo-Indian Settlement Patterns at Pleistocene Lake Tonopah
- 11:00 Robert Elston, Medithermal Climatic Variation and Culture Change on the Sierra Eastern Front
- 11:20 Peter J. Mehringer, Jr., Donald K. Grayson, and C. Melvin Aikens, The Steens Mountain Prehistory Project
- 11:40 David B. Madsen, The Concept of an Early Archaic: Fact or Fantasy
- 12:00 Donald L. Hardesty, Historical Archaeology in the Great Basin: Retrospect and Prospect

(6) General Session: METHOD AND THEORY

- Coconino
Chairperson: Daniel Wolfman
Participants:
- 8:30 Jeffrey Eighmy, Robert Sternberg, and Robert Butler, Recent Archaeomagnetic Results from the Southwest
- 8:45 Daniel Wolfman, Recent Archaeomagnetic Results from Arkansas
- 9:00 Afifa A. Hassan, C. Vance Haynes, Jr., and Herbert Haas, Evaluation of Bone for Radiocarbon Dating
- 9:15 William O. Autry, Jr., The Role of Documentary Sources in Archaeology: Where Has All the Theory Gone?
- 9:30 Richard C. Lange, Sample Circles: An Effective Approach to Sampling Large Surface Sites
- 9:45 Julie E. Francis and Kent G. Lightfoot, The Effect of Casual Collection on Behavioral Interpretations of Archaeological Data
- 10:00 Laurence M. Spear, Some Geographic Techniques and Their Application to Intrasite Spatial Analysis
- 10:15 Renata B. Wolynec, Archaeological Features and Information
- 10:35 Larry L. Baker, Bruce A. Burns, James A. Terrel, Karol J. Klager, and Stephen R. Durand, A Non-Typological Ceramic Method for Fine Chronological Distinction

- 10:50 Patricia E. Rubertone, An Archaeological Approach to Complex Societies Using Measures of Ceramic Variability
- 11:10 Henry C. Koerper and Gary Stuckel, The Primary Cultural Processes Towards a Unified Genetic Analogue Model of Culture Change
- 11:35 Michael B. Schiffer, Some Characteristics of Information Flow in Archaeology

(7) Symposium: URBAN HISTORICAL ARCHAEOLOGY IN THE UNITED STATES

- Apache
Organizers and Chairpersons: Roy S. Dickens, Jr. and William R. Bowen
Participants:
- 9:00 Frederick J. E. Gorman, Refuse Patterning in an Eighteenth Century Glass Manufacturing Community: Implications for Urban Historical Archaeology
- 9:20 Patrick H. Garrow, The New and the Old: The Bedford-Pine and Edenton Archaeological Investigations
- 9:40 Bert Salwen, Archaeology in Megalopolis: Updated Edition
- 10:00 Roy S. Dickens, Jr. and William R. Bowen, Problems and Promises of Urban Archaeological Surveys: The MARTA Project
- 10:20 Roger T. Grange and Gary Ellis, Excavations at Ybor City, Tampa, Florida
- 10:40 Craig T. Sheldon, Jr., Urban Archaeology in Brunswick, Georgia
- 11:00 Discussants: William L. Rathje, Stanley South

THURSDAY AFTERNOON, MAY 4

(8) Symposium: REGIONAL DIVERSITY ON THE HOHOKAM PERIPHERY

- Mohave
Organizer and Chairperson: David E. Doyel
Participants:
- 2:00 George J. Gumerman, The Hohokam of the Northern Periphery
- 2:20 Donald E. Weaver, Jr., The Northern Frontier, Hohokam Regional Diversity as Seen from the Lower Salt River Valley
- 2:40 Peter J. Piles, Jr. and Paul R. Fish, Colonies, Traders, and Traits: The Hohokam in the North
- 3:00 Discussants: James Rodgers, Albert H. Shroeder
- 3:30 Martin E. McAllister and J. Scott Wood, The Northeastern Periphery of the Hohokam Core Area: Big Time Exchange or Small Potatoes?
- 3:50 Paul Greninger, Desert vs. River Hohokam: A Materialist Critique and Research Design
- 4:10 Discussant: David E. Doyel
- 4:25 Charles C. Di Peso, The Hohokam and the Ootam
- 4:45 W. Bruce Masse, The Hohokam of the San Pedro Valley and Papagueria: Continuity and Variability in Two Regional Populations
- 5:05 Discussants: W. Doelle, David Wilcox
- 5:40 Discussion

(9) Symposium: RECONSTRUCTION OF SOCIAL ORGANIZATION IN NORTHERN PERU

- Maricopa
Organizers and Chairpersons: Margaret A. Hoyt, Alexandra M. Ulana Klymyshyn
Participants:
- 2:00 Garth Bawden, The Social Context of Moche V Ceramics
- 2:20 Melody Shimada and Izumi Shimada, Generative Aspects of Socioeconomic Stresses
- 2:40 Donald E. Thompson, Structure-Function in Precolumbian Villages in the Peruvian North Highlands
- 3:00 Margaret A. Hoyt, Chimú Status Differentiation as Reflected in the Ceramics
- 3:20 Patricia J. Netherly, Archaeological Implications of Social Organization on the North Coast of Peru
- 3:40 Alexandra M. Ulana Klymyshyn, Social Organization in an Imperial Capital
- 4:00 John R. Topic, Class, Prestige, Bureaucracy, and Authority in Pre-Incaic Peru
- 4:20 Discussion

(10) Symposium: MAYA ECOLOGY AND AGRICULTURE FROM THE PERSPECTIVE OF THE NATURAL SCIENCES

- Greenlee
Organizer and Chairperson: Frederick M. Wiseman

- Participants:**
 2:00 Frederick M. Wiseman, Introduction
 2:10 Gerald W. Olson, Some Pedological Observations of Soils in Maya Areas in Relation to Archaeology
 2:35 Edward S. Deevey, Don S. Rice, and Mark Brenner, Classic Maya Impact on a Lacustrine Environment
 3:00 Robert B. Waide, The Effect of Slash-and-Burn Agriculture on the Avifauna of Southern Campeche
 3:25 Hague H. Vaughan, Interpretation of Prehistoric Disturbance of Vegetation in the Area of Lake Quexil, Peten, Guatemala
 3:50 Lawrence H. Feldman, Snails, Clams and Mayas: The Use of Mollusks to Measure Ecological Change
 4:15 Suzanne K. Fish, Palynology of Edzna and Aquacatal: Environment and Economy
 4:40 Alfred H. Siemers, Maya Raised Fields in a Broadened Context
 5:15 Frederick M. Wiseman, The Terminal Classic Maize Episode
 5:40 Discussants: T. Patrick Culbert, Edward S. Deevey

(11) General Session: NORTH AMERICAN ARCHAEOLOGY I

- Graham
 Chairperson: Ruthann Knudson
Participants:
 2:00 Robert F. Maslowski, Moorehead Cave Cordage Analysis: Its Cultural and Technological Implications
 2:15 Rain Vehik, Archaeological Survey Along the Sheyenne River, Eastern North Dakota: A Preliminary Report
 2:30 Janet Friedman and Floyd Sharrock, Prehistory in Hells Canyon National Recreation Area
 2:45 Richard M. Pettigrew, The Prehistoric Chewaucanians: Lake Dwellers of Lake Abert, Southeastern Oregon
 3:00 Joanne M. Mack, A Ceramic Tradition from the Siskiyou Mountains of Southwestern Oregon
 3:15 Rick Minor, Late Period Settlement at the Mouth of the Columbia River
 3:30 Robert Lee Sappington and Ruthann Knudson, The Lytle Gulch Site, Shoshonean Adaptations, and Northern Great Basin Prehistory
 3:45 Louis James Tartaglia, Early Prehistoric Shoshonean Contacts in Southern California
 4:00 Jason W. Smith, Brian O. K. Reeves, and John M. D. Pohl, The Mission Ridge Site: A Pre-Wisconsin Human Occupation on the Southern California Coast
 4:15 Richard Levy, The Linguistic Prehistory of California: A Processual View
 4:35 Emma Lou Davis, Use of Tethered Balloon Photography for Analyzing Paleoamerican Sites: A China Lake Example
 5:05 Wendy Hanford Arundale, A Preliminary Survey of the Cape Dorset Area, Baffin Island, N.W.T., Canada

(12) Symposium: AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY SYMPOSIUM ON CONSERVATION ARCHAEOLOGY

- Gila
 Organizer and Chairperson: Donald K. Grayson
Participants:
 2:00 Deward Walker and James J. Hester, Use and Abuse of Ethnographers in Cultural Resource Management
 2:25 Howard M. Davidson and Deborah Westfall, An Example of Multi-Stage Research Within a Cultural Resource Management Framework
 2:50 Joseph G. Gallagher, Scarification and Cultural Resources: An Experiment to Evaluate a Timber Management Technique
 3:15 Christopher S. Peebles, The River Raisin Archaeological Survey, Michigan
 3:40 Richard W. Casteel, Federal Government Support of Archaeology in the United States: 1946-1977
 4:05 J. Jefferson Reid, To Soothe the Salvage Beast
 4:30 Bruce Anderson, The Antiquities Act in the 10th Circuit Court: Failure to Prosecute Due to Vagueness
 4:55 Charles M. McKinney, Recent Antiquity Legislation Initiatives
 5:20 Discussion

(13) Symposium: NON-STRUCTURAL SITE DISCOVERY IN HEAVILY VEGETATED AREAS: METHODOLOGIES AND TECHNIQUES

- Coconino**
 Organizers: Francis P. McManamon and David J. Ives
 Chairperson: Francis P. McManamon

- Participants:**
 2:00 Francis P. McManamon, Discovering Non-Structural Sites in the Eastern United States: Past and Future Directions
 2:20 Dena F. Dincauze, Predicting Relative Site Densities: Two Techniques for Landscape Analysis
 2:40 John J. Knoerl, Data Resolution in Measuring Site Location in Heavily Vegetated Areas: Methodology and Techniques
 3:00 Laurel Casjens, Approaches to Site Discovery
 3:20 David R. Evans and David J. Ives, Locating Sites in East-Central Missouri: Problems and Solutions
 3:40 Peter Thorbahn, Site Survey in New England: A Field Experiment in Sampling Theory and Method
 4:00 Joan M. Gero and Dolores Root, Data Retrieval from Stored Memories
 4:20 Mark Brooks and Stanton W. Green, A Strategy for Determining the Extent and Variability of Archaeological Sites in Temperate Forest Localities
 4:40 Glen Hanson, Richard Taylor, and Marion Smith, The Russell Archaeological Project: A Survey of Forested Lands in the South Appalachian Piedmont
 5:00 Albert A. Dekin, Spatial Theory and the Effectiveness of Site Examination in the Northeast
 5:20 Discussant: Stuart Stuever

(14) Symposium: THE ANTHROPOLOGY OF EARLY HAWAII

- Apache
 Organizers and Chairpersons: P. Bion Griffin and Robert J. Hommon
Participants:
 2:00 Patrick V. Kirch, Ecological Perspectives on Prehistoric Hawaiian Marine Exploitation
 2:20 Michael W. Kaschko, Hawaiian Social Unit Boundaries as Artifacts
 2:40 Paul Rosendahl, The Impact of Early Hawaiians on Their Island Environment
 3:00 Edmund J. Ladd, Hawaii Island Dryland Agriculture
 3:20 William K. Kikuchi, The Evolution of Hawaiian Aquaculture
 3:40 Patricia Price-Beggerly, Pre-Agricultural Hawaii: A Possible Model
 4:00 Thomas J. Riley, The Peopling of Hawaii
 4:20 H. D. Tuggle, B. Fankhauser, and L. Olson, The Application of Thermoluminescence to Problems of Dating and Sourcing Hawaiian Volcanic Glass Artifacts
 4:40 Robert J. Hommon, Inland Expansion and the Formation of Hawaiian Incipient States: A.D. 1400-1650
 5:00 P. Bion Griffin, Technology and the Hawaiian Adaptive System
 5:20 Hallett H. Hammatt, Geoarchaeological Stratigraphy in the Hawaiian Islands: Some Propositions and Preliminary Results

(15) COMMITTEE ON THE STATUS OF WOMEN IN ARCHAEOLOGY

- Maricopa
 Open Meeting: The business of the meeting will include a panel discussion on the theoretical and methodological aspects of Women in Prehistory
 6:00 OPEN HOUSE
 7:30 Concourse Lobby
 Cash Bar
 6:00-7:30 SOCIETY OF PROFESSIONAL ARCHAEOLOGISTS
 Mohave
 Annual Business Meeting

THURSDAY EVENING, MAY 4

(15) General Session: QUANTITATIVE METHODS

- Maricopa
 Chairperson: Mark S. Aldenderfer

- Participants:**
- 8:00 Richard L. Weisbrod, An Examination of Pattern Classification Techniques in Archaeological Typology
 - 8:15 Dawn E. Janney, Preparing Large Samples for Computer Analysis
 - 8:30 Craig Baker, The Use of Natural Topographic Data for Predicting Site Locations: An Example from the Central Arizona Ecotone Project
 - 8:45 A. E. Rogge and Patricia Eyring Brown, Spatial Analysis of Surface Sherd and Lithic Scatters
 - 9:00 Mark S. Aldenderfer, Empirically Evaluating Multivariate Statistical Methods: Site Typologies and Cluster Analysis
 - 9:20 James A. Terrel and Bruce A. Burns, Quantitative Architectural Analysis at Guadalupe Ruin, Sandoval County, New Mexico
 - 9:35 Philip G. Chase, Quantitative Inferences Based On Pottery Fragments
- (16) Symposium: CONFERENCE ON MESOAMERICAN ETHNOHISTORY: SAHAGÚN, THE MAN AND HIS MANUSCRIPTS**
- Greenlee
Organizer and Chairperson: Nancy P. Troike
- Participants:**
- 8:00 Arthur J. O. Anderson, A Note on Sahagún's Spanish Text
 - 8:25 Ellen Taylor Baird, The Artists of Sahagún's *Primeros Memoriales*
 - 8:50 Thelma D. Sullivan, *Tlatoani* and *Tlatoayotl* in the Sahagún Manuscripts
 - 9:15 Wigberto Jimenez-Moreno, Sahagún in the Intellectual Context of His Time
- (17) General Session: LATIN AMERICAN ARCHAEOLOGY**
- Graham
Chairperson: Christy G. Turner, II
- Participants:**
- 8:00 Michael J. Snarskis, The Earliest Ceramics from Costa Rica: La Montana, A Middle Formative Site on the Atlantic Watershed
 - 8:20 Carl D. Spath, El Muerto Rock Shelters: A Study in Non-Ceramic Culture on the Guayas Coast, Ecuador
 - 8:40 Marion G. Olsen, Surface Investigation of the Machalilla Component at Real Alto, Ecuador
 - 9:05 Theresa L. Topic and John R. Topic, Fortification Systems of Northern Peru
 - 9:20 Richard P. Watson, The Reconstruction of Prehistoric Agricultural Potential from Environmental Parameters: The Chimu Case
 - 9:35 James S. Kus, Eric E. Deeds, Michael E. Moseley, Shelia G. Pozorski, and Thomas G. Pozorski, The Programa Riego Antiguo
 - 9:50 Christy G. Turner, II and Junius B. Bird, The Dentition of the Chilean Cerro Sota-Palli Aike Cave Indians and the Peopling of the Americas
- (18) Symposium: PUBLIC ARCHAEOLOGY IN AMERICA**
- Gila
Organizer: S. Alan Skinner
Chairpersons: Hester A. Davis and S. Alan Skinner
- Participants:**
- 8:00 Stuart Struever, Private Support of Archaeology: The Northwestern University Example
 - 8:20 Roberta Greenwood, Land Developers Involvement in Public Archaeology
 - 8:40 Larry Banks, Public Archaeology in the Corps of Engineers
 - 9:00 S. Alan Skinner and Deborah T. Connors, Public Involvement in Field and Lab
 - 9:20 James H. Word, The Conserving Amateur Evaluates Professional Archaeology
 - 9:40 Discussion
- (19) General Session: LITHIC STUDIES I**
- Coconino
Chairperson: Mary Lee Douthit
- Participants:**
- 8:00 Mary Lee Douthit, Use of SPSS Factor in Lithic Analysis
 - 8:15 Jeanette L. Dickerson, Kenneth C. Rozen, and Howard M. Davidson, A Multistage Lithic Analysis of Materials from Southeastern Arizona
 - 8:30 Richard W. Jefferies, Lithic Artifact Diversity as a Means of Discerning Inter-Site Activity Variability
- 8:45 Charles M. Baker, Mimbres-Mogollon Lithic Assemblage Variability**
- 9:00 Deborah I. Olszewski and Alan H. Simmons, Memoirs of a Midden**
- 9:15 Terry Del Bene and Kenneth Feder, Micro-Distributional Analysis in the Examination of Lithic Activity**
- 9:30 Dennis Weder, The Functional Interpretation of Lithic Scatters During Surface Reconnaissance**
- (20) General Session: CONTRACT ARCHAEOLOGY**
- Apache
Chairperson: William J. Mayer-Oakes
- Participants:**
- 8:00 William J. Mayer-Oakes, Bureaucrats or Scholars—Who Controls Archaeological Research?
 - 8:20 John L. Montgomery, An Approach to Maximizing Data Retrieval in Contract Survey Projects
 - 8:35 Alan H. Simmons, Move That Dirt and Pass The Buck—The New Mercenaries?
 - 8:50 William A. Lucius, The Central and Southern Coal Projects of Utah: Methods and Results of Analysis for Two Large-Scale Contracts
 - 9:05 Michael R. Beckes, Archaeological Reconnaissance in the Southern Tularosa Basin: McGregor Guided Missile Range
 - 9:20 Alston V. Thoms, Contract Archaeology, Research Designs and Intensive Surveys
 - 9:35 LaMar Dollinger, Historic Research and the Cultural Resource Survey

FRIDAY MORNING, MAY 5

- (21) Symposium: LOCAL AND REGIONAL EXCHANGE SYSTEMS: NEW WORLD CASE STUDIES**
- Mohave
Organizer and Chairperson: Robert E. Fry
- Participants:**
- 8:30 Robert L. Rands, Patterns of Ceramic Exchange in the Palenque Region, Mexico
 - 8:55 Ronald L. Bishop, Ceramic Compositional Modeling at Maya Palenque
 - 9:20 Haree L. Deutchman, The Distribution of Tusayan White Ware Among the Kayenta Anasazi
 - 9:45 Paula H. Krotser and Evelyn Rattray, Distribution of Major Ceramic Wares Produced at Teotihuacan
 - 10:10 Lawrence P. Allen, Intra-Urban Exchange at Teotihuacan: Evidence from Mold-Made Figurines
 - 10:35 Robert E. Fry, Models of Exchange for Functional Classes of Lowland Maya Pottery
 - 11:00 Joseph W. Ball, Polychrome Pottery and Regional Exchange in the Early Classic Northern Maya Lowlands
 - 11:25 Prudence M. Rice, Postclassic Pottery Production and Exchange in the Central Peten, Guatemala
 - 11:50 Discussant: Dean Arnold
- (22) Symposium: METHODOLOGICAL AND THEORETICAL ISSUES IN THE ARCHAEOLOGY OF NORTHEASTERN ARIZONA: EXAMPLES FROM BLACK MESA**
- Maricopa
Organizers: Alan T. Synenki and Stephen Plog
Chairperson: Stephen Plog
- Participants:**
- 8:00 Joseph K. Anderson, Research Dealing with Archaeomagnetic Dating on the Black Mesa
 - 8:15 Jeff Hantman, and Stephen Plog, Predicting Occupation Dates of Prehistoric Black Mesa Sites: A Comparison of Methods
 - 8:30 Shereen A. Lerner, Analysis and Functional Interpretation of Black Mesa Ceramics
 - 8:45 Margerie Green, Variation in Chipped Stone Raw Material Use on Black Mesa
 - 9:00 Shirley Powell McAllister, The Effects of Seasonality on Site Space Utilization
 - 9:15 Alan T. Synenki, A Multivariate Approach for Examining the Relationship Between Surface and Subsurface Remains
 - 9:30 Terry Klein, Examination of Change in Social Group Size on Black Mesa
 - 9:45 Tony Klesert, Regional Variation on Black Mesa: A Comparison of Discrete Areas
 - 10:00 Mark Catlin, The Function of Limited Activity Sites in Prehistoric Subsistence Systems on Black Mesa

FRIDAY

- 10:15 Ben A. Nelson, The Problem of Hypocoherence in Systemic Reorganizations Preceding the Northern Black Mesa Abandonment
10:30 Robert B. Neily, Community Adaptation and Change on Black Mesa
10:45 Charles L. Douglas, Temporal Variability in Faunal Procurement on Black Mesa
11:00 David G. Eckles, Explanation of Intersite Variability in Faunal Remains from Sites on Black Mesa
11:15 Christine Hanson, Population Structure and Composition on Black Mesa
11:30 Richard I. Ford, C. Wesley Cowan, and Josselyn F. Moore, The Significance of Archaeological Plant Remains for Interpreting Prehistoric Adaptations on Black Mesa

(23) Symposium: THE ARCHAEOLOGY OF EMPIRES, STUDIES OF FRONTIER EXPANSION

- Greenlee
Organizer and Chairperson: Jerome Schaefer
Participants:
9:00 Robert M. Schacht, The Development of Imperial Institutions
9:20 Brad Bartel, Archaeological Operationalism of Colonialism and Imperialism: An Example for Provincial Rome
9:40 David M. Heisler, Roman Influence on the Peoples of Scotland
10:00 Jerome Schaefer, Days of Wine and Roses: The Byzantine Occupation of the Negev Desert
10:20 Break
10:30 Paula Wapnish and Brian Hesse, The Zooarchaeology of Empires
10:50 David L. Brownman, The Integration of Andean Tiwanaku with Its Hinterlands
11:10 Thomas P. Myers, The Fringes of the Inca Empire
11:30 Terence N. D'Altroy, Timothy K. Earle, and Catherine J. Leblanc, The Effects of Inca Expansion in the Upper Mantaro Valley, Peru
11:50 Discussant: John W. Eadie

(24) General Session: CULTURAL RESOURCE MANAGEMENT

- Graham
Chairperson: Thomas R. Lyons
Participants:
8:00 Thomas R. Lyons and Douglas H. Scovill, Non-Destructive Archaeology and Remote Sensing: A Theoretical and Methodological Stance
8:15 James I. Ebert, Remote Sensing and Large-Scale Cultural Resources Management
8:30 Galen N. Brown, Ecological Mapping for Purposes of Sample Stratification in Large-Scale Cultural Resources Assessment
8:45 Dwight L. Drager, Automated Data Processing of Digital Aerial Imagery in Cultural Resources Survey
9:00 Cordelia T. Snow, Remote Sensing Monitoring of Impact on Cultural Resources
9:15 J. Scott Wood and Joel C. Johnstone, The Salt River Recreation Plan: Cultural Resource and Land Use Management in the Tonto National Forest, Arizona

(25) General Session: LITHIC STUDIES II

- Graham
Chairperson: E. Mott Davis
Participants:
10:00 Neal W. Ackerly, Modeling Microwear Formation: A Feasibility Study Based on Fracture Mechanics
10:15 Jeanne A. Schutt, Artifact Recovery Procedures and Microwear Patterns
10:30 Laura Kosakowsky, Laurance Linford, Randall McGuire, Rebecca McSwain, John Whittaker, Richard R. Wilk, and Howard Davidson, Lithic Use Wear Research at the University of Arizona
10:45 Barbara A. Stafford, A Technofunctional Analysis of Payson Lithics: A New Method
11:00 Michael G. Spitzer, Predicting Workpiece Hardness from Microflake Scars on Orthogonal Cutting Tools
11:15 Sue Lewenstein, An Analysis of Experimentally Produced Edge Damage on Obsidian Blades
11:30 Philip A. Bandy, The Technological Reconstruction of a Northern Texas Lithic Assemblage
11:45 C. Russell Stafford and Barbara A. Stafford, The Implementation of Experimental Design in Lithic Studies

(26) Symposium: PALEO-INDIAN TO PLAINVILLE: HOLOCENE ADAPTATION IN THE TRUMAN RESERVOIR, SOUTHWESTERN MISSOURI

Gila
Organizer and Chairperson: W. Raymond Wood

Participants:

- 8:30 R. Bruce McMillan, Environment and Archaeology in Southwestern Missouri
8:45 C. Vance Haynes, Geochronology of the Lower Pomme De Terre River
9:00 James E. King, Biogeography of the Western Ozark Highland: The Pollen Evidence
9:15 Donald Lee Johnson, Soil-Geomorphic and Soil-Archaeologic Relationships, Osage River Basin, Western Ozark Highland
9:30 Frances B. King, Cultural, Climatic and Edaphic Factors Influencing Vegetation
9:45 David A. Baerreis, Paleoclimatic Implications of Gastropods at Rodgers Shelter
10:00 James R. Purdue, Environmental Implications Derived from the Rodgers Shelter Vertebrate Fauna
10:15 Marvin Kay, New Interpretations of Rodgers Shelter and Phillips Spring
10:30 Donna C. Roper, Settlement-Subsistence Systems in the Truman Reservoir Area
10:45 Russell L. Miller, Euro-American Settlement in the Lower Pomme de Terre Valley
11:00 Ngampit Satsangan, Plainville in Transition
11:15 Larry J. Sprunk, The Effect of Displacement on Rural People in Missouri's Osage River Basin
11:30 Discussants: David S. Brose, Karl Butzer, Howard D. Winters

(27) General Session: MAYAN ARCHAEOLOGY

Coconino
Chairperson: R. E. W. Adams

Participants:

- 9:00 Luanne B. Hudson and Donald Hales, St. George Amidst the Classic Maya: Serpent Slaying as Represented on Ceramic Vessels
9:15 Jeff Karl Kowalski, The Econography of the Central Motif of the House of the Governor at Uxmal
9:35 Hal C. Ball, Archaeological Investigations at Lamanai, Belize
9:50 Conran A. Hay and R. Rogers, The Structure of Obsidian Production at Early Classic Kaminaljuyú, Guatemala
10:10 D. Bruce Dickson and Laura Sanabria, Tikal, Milpa Agriculture and Population: A Simulation
10:30 Alfredo Barrera Rubio, A Study of Settlement Patterns in the Uxmal Area, Yucatán, Mexico
10:45 David Whitley and Raymond C. Sidrys, Distance, Direction and Spatial Organization in Northern Belize
11:00 R. E. W. Adams, Rank Ordering, Maya Centers, and Implications
11:15 Frederick J. Bove, Trend Surface Analysis and the Lowland Classic Maya Collapse
11:30 Robert L. Hamblin and Brian L. Pitcher, Elite Development and Peasant Rebellion: Modeling Classic Maya Data

(28) Symposium: HUMAN ECOLOGY AND ADAPTIVE TECHNOLOGY AT HINDS CAVE, VAL VERDE COUNTY, SOUTHWEST TEXAS

Apache
Organizer and Chairperson: Harry J. Shafer

Participants:

- 9:00 Harry J. Shafer, Introduction
9:10 Vaughn M. Bryant, Jr. and Phil Dering, A Fossil Pollen Record from Hinds Cave, Texas
9:25 Phil Dering, Pollen and Plant Macrofossils from Hinds Cave, Southwest Texas
9:40 Discussion
9:50 Glenna Williams-Dean, Daily Life of Prehistoric Man in the Lower Pecos Region of Texas
10:05 Kenneth J. Lord, Vertebrate Remains from Hinds Cave: A Computer Methodology
10:20 Discussion
10:30 J. M. Adovasio and R. Andrews, Perishable Industries from Hinds Cave
10:45 Mary Elizabeth King, The Sandals from Hinds Cave, Val Verde County, Texas
11:00 Discussion
11:10 Richard G. Holloway and Harry J. Shafer, Organic Residue Analysis of Prehistoric Lithic Artifacts: An Example From Hinds Cave, Texas
11:25 Harry J. Shafer, Technology and Tool Kits from Hinds Cave: Toward the Construction of Behavior Set Models
11:40 Discussant: Walter W. Taylor
11:50 Discussion

12:15-
1:45 MUSEUM COLLECTION MANAGERS AND CURATORS

Sonora A, Marriott Hotel
Organizational Meeting

FRIDAY AFTERNOON, MAY 5

(29) Symposium: PREHISPANIC SETTLEMENT PATTERNS IN THE VALLEY OF OAXACA, MEXICO

Mohave

Organizer and Chairperson: Richard E. Blanton

Participants:

- 2:00 Margaret Curran, An Examination of the Relationships between Agricultural Productivity and Population Densities Using Satellite Data
 2:20 Eva Fisch, Discontinuous Site Size Hierarchies in Formative Mesoamerica
 2:40 Richard E. Blanton, Monte Albán, Oaxaca, Mexico: Patterns of Urbanism at the Ancient Zapotec Capital
 3:00 Gary Feinman, The Effects of a Changing Administrative Organization on Ceramic Production Within the Prehispanic Valley of Oaxaca
 3:20 Stephen A. Kowalewski, Growth and Non-Growth in the Past and Present Valley of Oaxaca, Mexico
 3:40 Laura Finsten, The Classic-Postclassic Transition in the Valley of Oaxaca, Mexico
 4:00 Jill Appel, The Valley of Oaxaca Late Postclassic in an Evolutionary Perspective
 4:20 Discussant: Greg Johnson

(30) Symposium: PUEBLO CLIFF DWELLINGS: AN ENDURING INFORMATION SOURCE IN SOUTHWESTERN ARCHAEOLOGY

Maricopa

Organizers and Chairpersons: William D. Lipe and Jeffrey Dean

Participants:

- 2:00 Arthur Rohn, History and Potential of Studies of the Southwestern Cliff Dwellings
 2:20 Robert McLandress, An Architect's View of the Mesa Verde Cliff Dwellings
 2:40 Sarah Schlanger, Limits to Growth in Pueblo III Cliff Dwellings: An Examination of Eighmy's Model
 3:00 R. G. Matson, Locational Determinants of Cedar Mesa Cliff Dwellings
 3:20 Margaret Powers, Variability in Pueblo Building Strategies in the Cedar Mesa Region, Utah
 3:40 Richard V. N. Ahlstrom, Dendrochronology of the Hopi Pueblo of Walpi: A Preliminary Interpretation
 4:00 Cory D. Breternitz and Bruce Harrill, Dendroarchaeology of the Johnson Canyon Cliff Dwellings, SW Colorado
 4:20 Terry Walker, ML-1147, An Undisturbed Cliff Dwelling in SE Utah
 4:40 Don P. Morris, Significance of Cliff Dwellings in Canyon del Muerto, Arizona
 5:00 William D. Lipe, Centralized Storage at Moon House, A Pueblo III Cliff Dwelling in Southeast Utah
 5:20 Discussant: Jeffrey Dean

(31) Symposium: FORENSIC ARCHAEOLOGY

Greenlee

Organizers and Chairpersons: James W. Stoutamire and Dan Morse

Participants:

- 2:00 James W. Stoutamire and Dan Morse, Introduction
 2:10 James W. Stoutamire, Forensic Archaeology: A Course Outline
 2:30 Sheilagh T. Brooks and Richard H. Brooks, Archaeological Techniques Applicable to Forensic Investigation
 2:50 Jack W. Duncan, Search Techniques: Buried Bodies
 3:10 Martha Graham, Skeletal Recovery in Forensic Cases
 3:30 Break
 3:40 Dan Morse, Case Reports
 4:00 Clyde Snow and Burney M. McClurkan, The Cummins Prison Excavation
 4:20 Geoffrey Walker, Human Identification: Quantification and Recognition of Skull Fragments in Forensic Archaeology
 4:40 Pamela R. Fesperman, Non-Human Bone Alteration and Scatter Patterns
 5:00 Discussion

(32) Symposium: THE PALEOECOLOGY OF LOWER CENTRAL AMERICA

Graham

Organizer and Chairperson: Paul F. Healy

Participants:

- 2:00 Karen O. Bruhns, Commercial Agriculture in the Postclassic: A View from El Salvador
 2:20 Paul F. Healy, The Paleoecology of the Selin Farm Site (H-CN-5), Department of Colón, Honduras
 2:40 Lydia L. Wyckoff, Southwestern Nicaragua: A Study of Change
 3:00 Jean-François Moreau, Some Paleoecological Consequences of Two Volcanic Eruptions as Evidenced by the Molluscan Remains of a Costa Rican Shell Midden
 3:20 Frederick W. Lange, The Ruiz Site: A Late Polychrome Occupation Near the Bay of Culebra, Costa Rica
 3:40 Jeanne W. Sweeney, Ceramic Motifs and Subsistence
 4:00 Richard G. Cooke, The White-Tailed Deer in Prehistoric Panama: An Hypothesis for the Manipulation of Wild Populations in the Neotropics
 4:20 Discussants: Elizabeth S. Wing, Olga Linares

(33) Symposium: QUARRY SITE ACTIVITIES AND PRODUCTION ANALYSIS

Gila

Organizers and Chairpersons: Jonathan E. Ericson and Barbara A. Purdy

Participants:

- 2:00 Robin Torrence, Production for Export at the Melian Obsidian Quarries
 2:20 Jonathon E. Ericson, Diachronic Change of Three Exchange Systems as Viewed Through Obsidian Production
 2:40 William McDonough and Barbara Luedtke, Lithic Material Demand and Quarry Production
 3:00 Frank J. Findlow and Christine A. Rudecoff, Prehistoric Obsidian Use in Southwestern New Mexico
 3:20 Barbara A. Purdy, Contributions of Quarry Studies to Archaeological Interpretation
 3:40 Helen M. Leach, Mind Within Matter: Discovering the Technological Knowledge of Early New Zealanders
 4:00 Thomas R. Hester, Quarry Sites and the Lithic Production Systems of South and South Central Texas
 4:20 Discussant: M. H. Newcomer
 4:40 Discussion

(34) Symposium: RECENT PALEOLITHIC RESEARCH IN THE OLD WORLD

Coconino

Organizers and Chairpersons: Linda L. Tarasik and Francis B. Harrold, Jr.

Participants:

- 2:00 Catherine S. Flataker and Sheila Coulson, Mousterian Facies in England and in Mediterranean Spain
 2:20 Linda L. Tarasik, The Use of Attributal Analysis in the Design of Stone Tool Typologies: A Case Study Based on the Upper Paleolithic of Southwestern France
 2:40 Harvey M. Bricker, Recent Results of Archaeological and Paleoenvironmental Research at Les Tambourets
 3:00 Paul Fish, Beyond Tools: Debitage Analysis and Cultural Inference in the Middle Paleolithic
 3:20 Francis B. Harrold, Jr., A Comparative Study of Eurasian Paleolithic Burials
 3:40 G. A. Clark, L. G. Straus, J. Altuna, and D. Young, The La Riera Paleoecological Project (Asturias, Spain): Aims and Preliminary Results
 4:00 Susan Blifeld, Attributal Analysis of Solvieux Burins
 4:20 L. G. Freeman and Kathleen Volman, The Garbage Shall Rise Again: Stones, Bones, Charcoal and Seeds from Mousterian Levels at Abric Agut (Barcelona, Spain)
 4:40 Volman, Thomas P., Middle Stone Age Artifact Variability in the Southern Cape Province, South Africa
 5:00 Discussants: A. J. Jelinek, J. R. Sackett

(35) General Session: NORTH AMERICAN ARCHAEOLOGY II

Apache

Chairperson: David S. Dibble

Participants:

- 2:00 Humberto Dominguez Chavez, Los Petroglifos del Cerro San Rafael Coahuila, Un Modelo de Investigación

PRIDAY

- 2:15 Mark A. Grady, Consideration of the Texas Archaic Interaction Sphere
 2:30 David S. Dibble, The Inferno Phase: Evidence for a Late Occupation in the Lower Pecos River Region, Texas
 2:45 George B. Thomas, Survey Methods and Settlement Pattern at Fort Hood, Texas
 3:05 Mark J. Lynott, Hunting and Gathering Site Types and Assemblage Variability in the Southern Rolling Plains
 3:25 Barbara Vander Leest, The Ramey Field, Cahokia Surface Collection: Some Preliminary Results
 3:40 Veletta Canouts, Ernest E. May, and Neal H. Lopinot, Upland Archaeology: An Example from Southern Illinois
 3:55 Anne-Marie E. Cantwell, Hopewell Redux: Patterns of Chert Use During the Havana Tradition
 4:10 E. Steve Cassells, The Judson College Site, A Late Archaic Camp in Northern Illinois
 4:30 Nan Rothschild, Sarah Bridges, and Bert Salwen, The Onderdonk Site: An Historical Continuum
 4:45 Sarah Peabody Turnbaugh and William A. Turnbaugh, Alternative Applications of the Mean Ceramic Date Concept for Interpreting Behavior
 5:05 William A. Turnbaugh, Flooding as a Transformer of the Archaeological Record
 5:25 Sydne B. Marshall, The Paleo-Indian Component Shawnee-Minisink Site, Eastern Pennsylvania
 5:45 SOCIETY FOR AMERICAN ARCHAEOLOGY ANNUAL BUSINESS MEETING
 Community Center Music Hall
 Cynthia Irwin-Williams, President
 Presentation of the 1977 Alfred Vincent Kidder Award by Gordon R. Willey to Emil W. Haury
 8:00 RECEPTION FOR NEW MEMBERS
 Coconino
 Present and past officers of the Society greet new members and members attending their first annual meeting

SATURDAY MORNING, MAY 6

- (36) Symposium: MODELS OF PREHISTORIC SUBSISTENCE CHANGE
 Mohave
 Organizer: Andrew L. Christenson
 Chairperson: Timothy K. Earle
 Participants:
 9:00 Timothy K. Earle, A Model of Subsistence Change
 9:20 Andrew L. Christenson, Explaining Changes in the Food Niche of Human Populations
 9:40 Christine A. Hastorf, Changing Resource Use in Subsistence Agricultural Groups: Predictions from an Economic Model
 10:00 W. Frederick Limp, Subsistence Change and Optimization Theory
 10:20 Van A. Reidhead, Simulating Optimal Resource Use in Subsistence Change
 10:40 Mark N. Cohen, Carrying Capacity, Periodic Resource Failure, and the Regulation of Pleistocene Populations: A Critique of Some Recent Models
 11:00 Gary Coombs, Decision Theory and Subsistence Strategies: Some Theoretical Considerations
 11:20 Discussants: Robert N. Netting, Ester Boserup
- (37) Symposium: NEW FRONTIERS IN THE ARCHAEOLOGY AND ETHNOHISTORY OF THE GREATER SOUTHWEST
 Maricopa
 Organizers and Chairpersons: Carroll L. Riley and Basil C. Hedrick
 Participants:
 8:30 Ellen Abbott Kelley and J. Charles Kelley, Sipapu and Pyramid Too: The Temple of the Crypt at Alta Vista, Chalchihuites
 8:55 Richard A. Pailes, The Upper Rio Sonora Valley in Prehistoric Trade
 9:20 Richard H. Brooks and Sheilagh Brooks, Cranial Deformation: Possible Evidence of Pochteca Trading Movements
 9:45 John Hobgood, Aztec Aztlan and the Greater Southwest
 10:10 Bertha P. Dutton, An Overview of the Galisteo Archaeology
 10:35 Jonathan E. Reyman, The Predictive Dimension of Priestly Power
 11:00 Theodore R. Frisbie, Social Ranking in Chaco Canyon, New Mexico: A Mesoamerican-Derived Reconstruction
 11:25 Discussion

- (38) General Session: SOUTHWESTERN ARCHAEOLOGY I
 Greenlee
 Chairperson: Robert C. Euler
 Participants:
 8:00 Signa Larraide, Shared Aesthetic Traditions: Pottery and Textile Design Relationships in Arizona, 1100-1350
 8:15 Patricia Crown Robertson, Southwestern Ceramic Classification: New Insights from the Chodistaas Site
 8:30 Robin A. Gould, George R. Holley, and Veletta Canouts, Ceramic Imitation: A Supply-Demand Interpretation
 8:45 E. Charles Adam, Room Size and Its Relation to Room Function
 9:00 Rosalind Hunter-Anderson, The Rise of Matrifocality in the Western Pueblo Region
 9:15 Robert D. Diggs, Prehistoric Exploitation of a Microenvironment in East Central Arizona
 9:30 L. R. Sutro, N. W. Ackerly, and R. T. Fehr, Activity Structure at Wart Rockshelter in East Central Arizona
 9:45 Richard W. Effland, Jr. and Robert C. Euler, A Spatial Analysis of Kayenta Anasazi Occupation of the Inner Grand Canyon
 10:00 David Batcho, Preliminary Investigations at Chavez Pass Ruins, Coconino National Forest, Arizona
 10:15 Charles F. Merbs, Randall M. Smith, Jeffrey C. Long, and Donald H. Morris, Human Burials from Chavez Pass, Coconino National Forest, Arizona
 10:30 Roberta A. Jewett, Social and Settlement Organization in Tonto Basin, Central Arizona
 10:45 Charles J. Utermohle, Charles F. Merbs, and Jeffrey C. Long, Hohokam Burials from the Salt River Valley, Arizona
 11:00 E. Jane Rosenthal, Regional Shell Exchange in the Arizona Papagueria
 11:15 J. Richard Ambler, The San Mateo Project So Far
 11:30 Sandra L. Olsen, Micro-Wear Analysis of Utilized Bone from Grasshopper Ruin, Arizona

(39) Symposium: THE SHORT ARCHAEOLOGICAL SURVEY: PROBLEMS AND DIRECTIONS

- Graham
 Organizer and Chairperson: Mary Jane Buttigieg-Berman
 Participants:
 8:30 Stanley D. Bussey, The Small Contract as Research
 8:50 Thomas J. Padgett, Problems and Promise of the Small-Scale Archaeological Survey: the Debate in the Southeast
 9:10 Nina M. Versaggi, Small-Scale Survey: Methods of Organization and Management
 9:30 Walter K. Wait, The Small Survey in Regional Interpretations: The San Juan Data Base Project
 9:50 Glen E. Rice and Shirley Powell McAllister, The Incorporation of Small Contract Projects into a Regional Sampling Design
 10:10 David Stuart, Topographic Variability and Site Placement: Developing a Strategy for Maximizing Small Project Survey Data
 10:30 Mary Jane Buttigieg-Berman, The Small-Scale Survey Report: Creation of a Data Base
 10:50 Karen L. Way, Guidelines for the Design of Small Project Reports
 11:10 Discussants: Hester A. Davis, George J. Gumerman, D. Green

(40) General Session: MESOAMERICAN ARCHAEOLOGY

- Gila
 Chairperson: Melvin L. Fowler
 Participants:
 8:00 Louise I. Paradis, The Political Status of the *Tierra Caliente* of Guerrero, Mexico: 1500 B.C.—A.D. 1500
 8:15 Prudence Precourt, Site Survey Techniques and Sub-Regional Settlement Patterns: The Puebla Valley
 8:30 Gerald Cone, Computer Aided Analysis of Ceramics from the Puebla Preclassic Project
 8:45 Melvin L. Fowler and Prudence S. Precourt, Pre-Hispanic Lithic Industries in the Puebla Valley
 9:00 Gregory B. James, Analysis of Figurines from the Puebla Preclassic
 9:15 William I. Woods, Field Tunnel Erosion—A Mesoamerican Example
 9:30 Donovan C. Senter, The Tlahuica of the Valley of Xochicalco, Morelos
 9:45 Joseph B. Mountjoy, Researching the Prehistory of the Tomatlan River Valley, 1975-1977

SATURDAY

variations

dead coat + photo period, etc.

- 10:05 Helen P. Pollard and Shirley Gorenstein, A Research Design for the Study of the Protohistoric Tarascan Political System
 10:25 John P. Smith, The Forms of Patolli: Their Interrelationships and Some Symbolic Associations
 10:45 Terry Stocker, The Ballgame Between Tezcatlipoca and Quetzalcoatl
 11:05 Susan T. Evans, A Structural Analysis of Central Place Development in the Valley of Mexico
 11:20 Michael E. Smith, A Comparative Perspective on the Aztec Marketing System

- (41) Symposium: PALEOETHNOBOTANICAL ROUNDTABLE: THE IDENTIFICATION AND INTERPRETATION OF EVIDENCE FOR PALEOETHNOBOTANICAL RECONSTRUCTIONS IN THE SOUTHWEST

Coconino
 Organizer and Chairperson: Richard I. Ford
 Discussants: Vorsila L. Bohrer
 Vaughn M. Bryant, Jr.
 Robert A. Bye, Jr.

Hugh Cutler
 Jeffrey S. Dean
 Richard I. Ford
 Lawrence Kaplan
 James Schoenwetter
 Wilma Wetterstrom
 Joseph C. Winter

Guthman?
 Hey Doctor 1975

Colorado

Durrant

(genetic fixing as
 result of soil
 conductivity etc.)

- (42) Symposium: THE CORONADO ARCHAEOLOGICAL PROJECT: RESEARCH IN THE PRE-HISTORY OF EASTERN ARIZONA

- Apache
 Organizers: William S. Marmaduke and Bettina H. Rosenberg
 Chairperson: William S. Marmaduke
 Participants:
 9:00 Bettina H. Rosenberg, Electricity Generates Archaeology: A Utility's Role in Contract Archaeology
 9:30 Claudia Berry, Lithic Analysis of Assemblages from Northeastern Arizona
 10:00 Dana Hartman, Archaic Adaptations in East Central Arizona
 10:30 Cherie Scheick, The Nature of Archaeological Transects in Regional Studies, Part I
 11:00 James E. Bradford, The Nature of Archaeological Transects in Regional Studies, Part II
 11:30 William S. Marmaduke, The Growth and Development of the Prehistoric Community at Cottonwood Seep
 12:15- AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY
 1:30 Greenlee
 Annual Business Meeting

SATURDAY AFTERNOON, MAY 6

- (43) Symposium: TRACE ELEMENT ANALYSES OF CHERT: PROBLEM-ORIENTED RESEARCH

- Mohave
 Organizer and Chairperson: David J. Ives
 Participants:
 2:00 Harvard Ayres, The Geology of Cherts—A Geoarchaeologist's Views
 2:25 Ruthann Knudson, Alice in Wonderland: The Experiments and Education of an Archaeological Non-Chemist in the World of Non-Obsidian Lithic Trace Element Analysis
 2:45 Ronald H. Spielbauer, Trace Element Analysis: A Suggested Key to the Identification of Mill Creek and Hartline Cherts
 3:05 Glen Freimuth and Bruce White, X-Ray Fluorescence Analysis of Certain Midwest Cherts
 3:25 David J. Ives, The Use of Trace Elements in Fingerprinting the Crescent Hills Prehistoric Quarrying Area
 3:45 D. R. Mock, B. A. Purdy, and H. A. Van Rinsvelt, Proton-Induced X-Ray Emission Analysis of Florida Cherts
 4:05 Barbara E. Luedtke, Trace Elements and Trade in Prehistoric Michigan
 4:25 Panel Discussion

- (44) General Session: OLD WORLD ARCHAEOLOGY AND ETHNOARCHAEOLOGY

Maricopa
 Chairperson: Robert E. Ackerman
 Participants:

- 2:00 Judith A. Rasson, Interaction Spheres as Adaptive Mechanisms
 2:20 Janet E. Levy, Social Organization in Bronze Age Denmark
 2:40 Robert E. Ackerman and Alexei Pavlovich Okladnikov, Archaeology in the Soviet Far East: The Tadusha River Site
 2:55 Harold L. Dibble, Patterns of Shape in Flakes from the Tabún Cave, Israel
 3:15 Milla Y. Ohel, Conditions for Establishing Deliberate Modification of Lithic Specimens
 3:35 Michael S. Bisson, Zambian Copper Workers Revisited: A Note on Variation in Ethnoarchaeological Data
 3:50 Linda K. Jacobs, The Archaeological Implications of a Village in Transition: The Case of Tell-I Nun, Iran

- (45) General Session: SOUTHWESTERN ARCHAEOLOGY II

Greenlee
 Chairperson: James A. Neely

- Participants:
 2:00 E. Pierre Morenon and T. R. Hays, New Evidence from the Jornada Branch: Excavations in the Placitas Arroyo
 2:15 James A. Neely, Archaeology of the WS Ranch Site, West Central New Mexico: The 1977 Season
 2:30 Solveig A. Turpin and James A. Neely, Temporal and Spatial Variability in Prehistoric Great Kivas of the Mogollon Region
 2:45 Michael E. Whalen, Social-Organizational Implications of Household Distribution in a Late Mogollon Pithouse Village
 3:05 Kent G. Lightfoot, Food Redistribution in the Prehistoric Southwest
 3:20 Kenneth L. Kvamme, A Multivariate Model for Paleo-Demography: A Southwestern Example
 3:35 Gordon J. Bronitsky, Technological Innovation and Population Pressure
 3:55 Charles M. Mobley, Demographic Characteristics of Pecos Indians: A Model Based on Life Tables
 4:15 Dorothy K. Washburn, A Reanalysis of the Grave Goods from Pueblo Bonito: Some Mexican Affiliations
 4:35 Hannah Huse, Frank W. Eddy, and James J. Hester, The Bisti-Star Lake Cultural Resources Inventory
 4:50 Barbara J. Mills and T. J. Ferguson, The Miller Canyon Survey: Settlement Pattern in the Zuni Region
 5:05 William A. Dodge, T. J. Ferguson, and Barbara J. Mills, Archaeological Investigations at Kyakima, Zuni Indian Reservation
 5:20 T. J. Ferguson and Barbara J. Mills, The Growth of Zuni Pueblo

- (46) General Session: SOUTHEASTERN ARCHAEOLOGY

Graham
 Chairperson: Sharon I. Goad

- Participants:
 2:00 Janet E. Rafferty, Functional Analysis of Surface Collections, Tombigbee River, Mississippi
 2:15 William B. Lees and Kathryn M. Kimery-Lees, Form and Function of Colono-Indian Pottery in an Historic Plantation Context
 2:30 Lois E. Sanders, Physical and Cultural Variables Affecting Phosphate Deposition and Preservation at Archaeological Sites
 2:50 Chester B. DePratter and James D. Howard, Archaeological Implications of Holocene Geomorphologic and Eustatic Changes on the Georgia Coast
 3:05 Robert A. Karwesky, Patricia D. O'Grady, Pamela R. Fesperman, and James W. Stoumire, Archaeology of Mounds A and B and Plateau, Ocmulgee National Monument
 3:25 Charles E. Pearson, Prehistoric Settlement Change on the Georgia Coast
 3:40 David J. Hally, Activity Analysis of Three Structures from a Protohistoric Site in Northwest Georgia
 3:55 Chad O. Braley, Archaeological Testing of the Bay Pines V. A. Hospital Site, St. Petersburg, Florida
 4:10 Elizabeth J. Reitz, Analysis of Faunal Remains from St. Augustine, Florida

- 4:25 Kathleen M. Byrd and Robert W. Neuman, Archaeological Data Relative to Prehistoric Subsistence in the Lower Mississippi Alluvial Valley
 4:45 Sharon I. Goad, Exchange Networks in the Southeastern United States

(47) General Session: PALEOECOLOGY

Gila
 Chairperson: David R. Yesner

Participants:

- 2:00 Martin R. Rose, The Extension and Quantitative Retrodiction of Intra-Annual Paleo-climatic Variability on the Colorado Plateau: A Test Case
 2:15 Nikolaas J. Van der Merwe, F. B. Silberbauer, and J. C. Vogel, Carbon Isotopes and the Introduction of Maize to Ohio
 2:30 Diane E. McLaughlin and Thomas Stafford, A Short Pollen Core from Near the Lubbock Lake Site, West Texas
 2:45 Emily McClung de Tapia, Paleoethnobotanical Studies in Mesoamerican Archaeology
 3:05 Elizabeth Shepard Sheldon, A Reconstruction of a Prehistoric Environment and Its Useful Plants: Colonel's Island, Glynn County, Georgia
 3:20 Vorsila L. Bohrer, A Non-Palynological Method of Reconstructing Vegetation on the Heavily Overgrazed Rio Puerco Valley of New Mexico
 3:35 Karen R. Adams, A New Method for Quantitatively Evaluating Wild Plant Resources in the Rio Puerco Valley of New Mexico
 3:50 Kevin T. Jones, Paleoenvironment and Prehistoric Settlement Pattern in the San Luis Valley, South Central Colorado
 4:05 Steven D. Emslie, An Ethnobiological Study of the Avifauna at Pottery Mound
 4:25 David R. Yesner, Caribou Exploitation in Interior Alaska: Paleoecology of the Paxson Lake Site
 4:45 Frank E. Bayham, A Consideration of Species Abundance and Size on Animal Exploitation
 ✎ 5:00 R. Barry Lewis, Resource Dispersion and Hunter-Gatherer Band Spacing
 5:20 Dolores Root, Hunter-Gatherer Social Organization and Utilization of Varying Environments

(48) Symposium: CULTURAL RESOURCE INVENTORY AND THE MEASUREMENT OF UNCERTAIN IMPACTS

Coconino
 Organizer and Chairperson: John G. Douglas

Participants:

- 2:00 John G. Douglas, The Academician's Ideal and the Bureaucrat's Practical: Who Wins When Legal Compliance, Budget, and Time are Controlling?
 2:25 Gay M. Kinkade, Structured Reconnaissance Survey for the San Simon-Gila Environmental Statement, Southeastern Arizona
 2:50 Richard D. Malcomson, Combined Externally Biased and Random Cluster Sample Inventories in the Vermillion ES Area, North Central Arizona
 3:15 Chris Kincaid, Impact Assessment Through Stratified Random Sample Inventory for the Black-Cerbät ES Area, Northwestern Arizona
 3:40 Jeanne W. Fryman and Margaret A. Powers, Analysis of the Inventory Data for the Black-Cerbät Environmental Statement Area, Northwestern Arizona
 4:05 Patricia A. Giorgi, A Field Test of Archaeological Sensitivity Projections in the Black-Cerbät ES Area, Northwestern Arizona
 4:30 Discussants: Dorothy Hall, John Clonts, Fred Plog, Michael B. Schiffer

(49) Symposium: INTERDISCIPLINARY STUDIES IN OTOMANGUEAN

Apache
 Organizers and Chairpersons: J. K. Josserand and Marcus Winter

Participants:

- 2:00 Nicholas A. Hopkins, Otomanguean Linguistic Prehistory
 2:30 Marcus Winter, M. Gaxiola, G. Hernandez, D. Deraga, and R. Fernandez, Archaeology of the Otomanguean Area
 3:00 J. K. Josserand, Angeles Romero, and Maarten Jansen, Mixtec Dialectology: Inferences from Linguistics and Ethnohistory
 3:30 Marlys Bacon, Loanwords in Oaxacan Ceramic Terminology
 4:00 Discussants: R. Spores, M. Fowler, T. Kaufman
 5:00 Discussion

ABSTRACTS OF ORGANIZED SYMPOSIA

(1) CHANGE AND INTERACTION IN THE HOHOKAM CORE AREA. The papers discuss issues that have been central in our evolving understanding of Hohokam prehistory. These are reviewed in light of rapidly growing evidence on these people, evidence that is leading to significant revisions of some interpretations of local prehistory. Focal points are the origin of the Hohokam, their relationship to groups living further to the south, and processes in Hohokam cultural change. The nature of exchange relationships that integrated Hohokam communities is identified as an emerging issue of crucial importance.

(2) FRONTIER SYSTEMS AND BOUNDARY PROCESSES: AN APPROACH TO INTER-REGIONAL ANALYSIS. The analysis of prehistoric and historic social systems has recently shifted to include inter-site in addition to intra-site variables leading to a strong research impetus on the regional analysis of archaeological data. A further step in understanding regional dynamics is to open up the models used by archaeologists to permit examination of inter-regional processes that affect regional patterns. Frontier and boundary models provide a powerful means for identifying and incorporating inter-regional, social and ecological processes into our analyses. A series of papers will discuss frontiers and boundaries as aspects of open systems in a variety of archaeological (prehistoric and historic) contexts.

(3) SOCIAL USES OF MAYA BIOTA. Remains of plants and animals from the tropical Maya area have presented special problems in recovery and analysis. Nevertheless, a growing corpus of information can now be drawn upon to provide insight into a number of aspects of Maya life. The evidence is used to reconstruct patterns of resource procurement in both coastal and inland environments. Animal as well as human bones give a picture of nutrition and health. Studies of shells reveal craft specialization. Trade in animal products can be documented. Both shells and cave faunas shed light on ceremonial and ritual practices. The iconography of plants and animals at Palenque is also discussed.

(4) DIAGNOSTICS OF THE MIDDLE HORIZON IN PERUVIAN ARCHAEOLOGY. The concept of "Middle Horizon" in Andean archaeology has suffered from numerous ambiguities of definition and usage since its inception as a prehistoric time unit marking the widespread and nearly synchronic appearance of certain traits loosely associated with, or attributed to, the Huari and Tiahuanaco "complexes." Participants in this symposium will examine one or more diagnostic features that have been used in the past to define this highland-based cultural matrix and its coastal manifestations. Particular emphasis will be given to the assessment of their continuing validity as horizon makers. Papers may stress redefinition, refinement, and/or elimination of existing criteria, or may propose the use of new diagnostic features. The characteristics examined will be iconographic, technological and systemic, and will be either area-wide or region-specific in focus.

(5) CURRENT THEORY AND RESEARCH IN GREAT BASIN ARCHAEOLOGY. In recent years the emphasis of Great Basin archaeology has shifted away from the development and testing of regional and inter-regional models of hunter/gatherer man-land relationships to address more narrowly conceived problems. In some instances, this research has pursued questions developing out of previous investigations. In other instances, workers have applied theoretical or methodological innovations to problems previously ignored or studied inadequately because they proved particularly resistant to analysis. Symposium papers reflect both the growing diversity of interests and the increasing sophistication characterizing current archaeological research in the Desert West. Individual contributions comprise environmental studies as well as archaeological analyses of prehistoric groups ranging from Paleoindians to food producers to historical sites.

(7) URBAN HISTORICAL ARCHAEOLOGY IN THE UNITED STATES. Archaeological investigations in the American urban setting have increased in recent years. This is partly a result of the growth in federally-mandated cultural resource assessments. Additionally, there has been a trend within our discipline toward recognizing the importance of the entire material record, including recent urban and industrial remains, in the elucidation of cultural patterns and processes. The urban setting requires new techniques for finding, evaluating, excavating, and preserving archaeological resources. Urban historical sites present unique opportunities to combine documentary evidence, informant data, and material remains in broadly-based research strategies.

(8) REGIONAL DIVERSITY ON THE HOHOKAM PERIPHERY. The detail of archaeologists' understanding of groups living adjacent to the Gila-Salt Hohokam core area has increased drastically in recent years. This symposium reviews evidence from as far north as Flagstaff and as far south as the region of the U.S.-Mexico border. Several different hypotheses accounting for variability in the presence of Hohokam cultural materials in these areas are discussed. Interaction between these groups and those living in the core area may have covered the continuum from casual contacts to strong exchange relationships. Our understanding of Hohokam is highly dependent on correctly interpreting this interaction.

(9) RECONSTRUCTION OF SOCIAL ORGANIZATION IN NORTHERN PERU. The organizing theme of the symposium is the way in which social organization can be reconstructed in northern Peru. The main emphasis is on the coast, with some discussion of the highlands. The cultures that are covered include Moche V, Chimú, and Inca. Each paper examines either a specific body of data (ceramics, architecture and ethnohistorical records) or a particular problem (e.g., dual organization, reaction to socioeconomic stresses, imperial organization). The symposium is intended as an examination of the methodology involved and the way in which the different kinds of data can be used to cross-check each other.

(10) MAYA ECOLOGY AND AGRICULTURE FROM THE PERSPECTIVE OF THE NATURAL SCIENCES. Reconstruction of the prehispanic Lowland Maya landscape has become a major focus of Mesoamerican research. Study of subsistence systems, settlement patterns, and trade networks rely, to a certain extent, on largely implicit assumptions of the distribution and nature of prehispanic lowland tropical ecosystems. The archaeological record lacks the potential for landscape reconstruction, except through indirect means (such as the discovery of canal or terrace remnants). This symposium presents the non-artifactual record from the Maya Lowlands to provide an independent view of the environmental matrix of the prehispanic Maya. Results of fossil pollen analysis, pedology, geomorphology, and other disciplines produce a rapidly expanding body of knowledge that may be integrated with present archaeological research to derive unified models of environmental interaction of the Maya Civilization.

(12) AMERICAN SOCIETY FOR CONSERVATION ARCHAEOLOGY SYMPOSIUM ON CONSERVATION ARCHAEOLOGY. This symposium examines diverse aspects of cultural resource management in North America. The symposium concludes with an examination and discussion of proposed changes in federal antiquities legislation in the United States.

(13) NON-STRUCTURAL SITE DISCOVERY IN HEAVILY VEGETATED AREAS: METHODOLOGIES AND TECHNIQUES. The papers comprising this symposium report on specific applications of various site discovery and examination methodologies and techniques in areas of heavy vegetation, including grass, brush, and trees. Archaeologists' ability to reconstruct and analyze past cultural systems is directly dependent upon their ability to discover the physical remains of such systems. In many parts of the world site discovery and examination are hindered by heavy vegetation. The effectiveness of various approaches for site discovery and examination under such conditions is critically evaluated by these papers. Factors such as cost, time and equipment necessary and other theoretical or practical constraints are considered.

(14) THE ANTHROPOLOGY OF EARLY HAWAII. This symposium is designed to report recent advances across a wide spectrum of method and theory in the archaeological study of the precontact and early historic Hawaiian Islands. Recent and ongoing research explores problems of chronology, ecology, technology, demography, and social/cultural evolution in the context of extreme spatial isolation, mild climate, limited land area, short time sequence, and a complex social system. Special attention has been given in recent years to the use of support disciplines as diverse as geology, zoology, chemistry, ethnohistory, physics, and demography in studying ancient Hawaii.

(16) CONFERENCE ON MESOAMERICAN ETHNOHISTORY: SAHAGÚN, THE MAN AND HIS MANUSCRIPTS. This symposium will focus upon the documentary materials of the great Mesoamerican ethnographer Bernardino de Sahagún, who left lengthy descriptions and explanations of the cultures and archaeology of ancient Mexico. It will show the relationship of these data to the analysis and solution of both pre-Conquest and post-Contact problems. The participants, who are from Mexico, Europe, and the U.S., have been selected to reflect a broad coverage of the current research in the complex interdisciplinary field. Their papers will demonstrate how the utilization of these primary sources can contribute to resolving archaeological, anthropological, and ethnographical problems.

(18) PUBLIC ARCHAEOLOGY IN AMERICA. Archaeology in America is supported consciously or unconsciously by the general public, the great uninformed multitude, who faithfully pay taxes and sponsor legislation. Historically, archaeologists have hidden themselves away from the purview of the public in the ivory tower or dark recesses of an institution of higher learning, but the

advent of public archaeology is forcing archaeologists to become ever increasingly accountable for their actions and is placing them in the public spotlight. This symposium will show how the people of America are being informed about the findings of ongoing field and laboratory investigations and how they are being involved in the day-to-day protection and conservation of the irreplaceable remains of America's heritage. Suggestions for increasing public awareness will be offered and papers will focus on the "how to" aspects of public education.

(21) LOCAL AND REGIONAL EXCHANGE SYSTEMS: NEW WORLD CASE STUDIES. Recent studies of local and regional cultural systems have concentrated on settlement size and distribution. Significant information on systemic structure can also be generated from detailed technical and stylistic studies of locally produced and/or distributed items. This symposium will examine local and regional exchange systems based on studies of ceramics from several areas in the New World. A variety of approaches useful in distinguishing locally produced items are presented. The advantages of regional and site based programs of analysis are revealed.

(22) METHODOLOGICAL AND THEORETICAL ISSUES IN THE ARCHAEOLOGY OF NORTHEASTERN ARIZONA: EXAMPLES FROM BLACK MESA. The pace of archaeological research in northeastern Arizona has quickened in the last decade with the increase in funding from contracts with private companies and public agencies. The increased amount of new data, gathered through problem-oriented research, has enabled in-depth studies that focus on: (1) substantive issues relating to culture change in northeastern Arizona and (2) methodological and theoretical issues of interest to the archaeological community in general. Specifically, this symposium will focus on the evolution of procurement systems, community and settlement patterns, and a variety of methodological problems.

(23) THE ARCHAEOLOGY OF EMPIRES: STUDIES OF FRONTIER EXPANSION. Despite social, economic, and political complexity it is possible to observe similar processes operating in all expanding political systems. Lattimore made this evident from the historical comparison of frontier areas and he recognized the importance of archaeological work in these areas where historical documents are lacking or minimally useful. This symposium will present ongoing research from historical and non-historical contexts, in the Old and New Worlds, that are helping to formulate principles by which empires expand and subjugated populations adapt to that expansion.

(26) PALEO-INDIAN TO PLAINVILLE: HOLOCENE ADAPTATION IN THE TRUMAN RESERVOIR, SOUTHWESTERN MISSOURI. The papers synthesize more than a decade of research in the ecotone straddling the Ozark Highland and the western prairies of Missouri. An interdisciplinary research team has developed archaeological models for the 10,500-year human occupation documented for the area, as well as models for the paleoecology/biogeography of the area for the last 50,000 years. The symposium reports new work carried out since the publication of *Prehistoric man and his environments: a case study in the Ozark Highland* (Academic Press 1976); work conducted under auspices of the U.S. Army Corps of Engineers.

(28) HUMAN ECOLOGY AND ADAPTIVE TECHNOLOGY AT HINDS CAVE, VAL VERDE COUNTY, SOUTHWEST TEXAS. This symposium presents a series of studies on the human ecology and adaptive technology of the lower Pecos River area. Hinds Cave was utilized over a 10,000-year span by a continuum of hunter-gatherer populations. The dry cultural deposits contain remarkably well-preserved perishable materials and provide an unusually accurate view of the past environment, human ecology, and adaptive technology. These studies contribute a significant body of data pertinent to examining the adaptive strategies of pre-agricultural and non-agricultural foragers of the desert Southwest and northern Mexico.

(29) PREHISPANIC SETTLEMENT PATTERNS IN THE VALLEY OF OAXACA, MEXICO. The symposium summarizes the results of five seasons of systematic archaeological survey in the Valley of Oaxaca. To date the work completed includes the detailed mapping and extensive surface collection of Monte Albán, the ancient regional capital, as well as roughly 75% of the surface area of the valley. The papers will deal with problems related to population transitions and socio-cultural evolution, and changing modes of political and economic organization.

(30) PUEBLO CLIFF DWELLINGS: AN ENDURING INFORMATION SOURCE IN SOUTHWESTERN ARCHAEOLOGY. For nearly 100 years, the Pueblo cliff dwellings of the Southwest have held the attention of both archaeologists and the general public. This symposium documents the continuing scientific interest in these phenomena, as they are approached with new questions and research methods.

(31) FORENSIC ARCHAEOLOGY. Criminal investigators frequently encounter human remains in either buried or surface locations. Usually these remains are partially or completely skeletonized. In the past the quality of the recovery of this material has been haphazard. Difficulties in identification of poorly recovered material and prosecution in criminal cases has given rise to an interest

in archaeological recovery and anthropological interpretation of human material. This symposium examines this problem from anthropological and criminological perspectives and outlines the results of current work in this developing field.

(32) THE PALEOECOLOGY OF LOWER CENTRAL AMERICA. Intensification of archaeological research in several regions of Lower Central America in the last decade has provided a much more complete time-space framework for archaeologists, and simultaneously permitted exploration of more complex problems dealing with human adaptation and cultural response to the varied environmental setting of the isthmian zone. One major topic that has received recent archaeological attention in this culture area is paleoecology. Zooarchaeological and paleobotanical studies in Lower Central America are providing much needed data on the problems and questions of ancient human ecology, prehistoric climatic and environmental changes, food procurement and subsistence practices, resource management, and trade. The papers of the symposium examine current paleoecological research from several aboriginal sites and regions of Lower Central America.

(33) QUARRY SITE ACTIVITIES AND PRODUCTION ANALYSIS. Recently several papers have explored some of the interrelationships between quarry production and regional exchange of lithic resources. This is a timely subject that may act to synthesize two important areas of archaeological research. At present, there is a critical need to address both theoretical issues and operational procedures for future research. The strategies of quarry production analysis will be discussed and will include the procedures on how to document production modes and their changes in time, and how to discriminate discrete workshops in space-time. Once research is operationalized, a number of new problems can be investigated.

(34) RECENT PALEOLITHIC RESEARCH IN THE OLD WORLD. Anthropologically-oriented archaeology has much to offer to the study of Pleistocene cultural systems in the Old World. Gathered here are recent examples of such research, which may be grouped into three categories: (1) reports on multi-disciplinary investigations of Paleolithic occupation sites; (2) quantitative analyses of lithic artifact variability (both single-site and regional studies), which deal with systematics and the extraction of information about past human technological and subsistence activities; and (3) comparative papers that look at already-published data in new ways. Despite varying geographical and methodological foci, all the contributions involve attempts to expand our understanding of the lifeways of Pleistocene hunter-gatherers.

(36) MODELS OF PREHISTORIC SUBSISTENCE CHANGE. The tremendous variation in human food procurement and consumption across space and through time is a phenomenon of great significance to those interested in explaining human behavior. Archaeologists are fortunate to be in a strong position to make basic contributions to the understanding of long-term subsistence change in human populations. This symposium provides examples of the variety of theoretical and methodological approaches available for the study of prehistoric subsistence. The papers demonstrate important areas of overlap between the disciplines of economics, ecology, and anthropology.

(37) NEW FRONTIERS IN THE ARCHAEOLOGY AND ETHNOHISTORY OF THE GREATER SOUTHWEST. Drawing on work in progress by archaeologists, ethnohistorians, and cultural geographers, this symposium presents a cross section of new studies on the prehistory and contact history of the Greater Southwest. Symposium participants combine and reconcile the processual approach to Southwestern archaeology with the recent flood of evidence that massive contact, both within the Greater Southwest and from outside—especially from Mesoamerica—was a major factor in shaping Southwestern cultures.

(39) THE SHORT ARCHAEOLOGICAL SURVEY: PROBLEMS AND DIRECTIONS. The short, small-scale archaeological survey constitutes the bulk of contract archaeology, but has been ignored as a rich data base in favor of the large-scale regional survey. This symposium concentrates on the research potential offered by the small contract survey. A series of research designs that have been employed to direct this mode of data retrieval is presented. A demonstration of how data can be integrated into predictive settlement models is evaluated in relationship to the biases inherent in small survey investigations. Finally, a means of communicating small survey data—so they can be used in a theoretical research framework, as well as to provide information required by contracting agencies and planners for the management of resources—is presented in a model designed for small project reports.

(41) PALEOETHNOBOTANICAL ROUNDTABLE: THE IDENTIFICATION AND INTERPRETATION OF EVIDENCE FOR PALEOETHNOBOTANICAL RECONSTRUCTIONS IN THE SOUTHWEST. The methods and models for reconstructing the patterns of plant utilization from archaeological sites in the Southwest will be discussed by the participants of this roundtable. Evidence of domesticated, cultivated, and non-cultivated plants will be examined from the perspective of new

methods of identification, alternative models of interpretation, and directions for future research. The importance and implications of associated botanical evidence—charcoal, pollen, seeds, phytoliths, etc.—will be reviewed and debated by the participating paleoethnobotanists. Questions and comments from the audience are encouraged.

(42) THE CORONADO ARCHAEOLOGICAL PROJECT: RESEARCH IN THE PREHISTORY OF EASTERN ARIZONA. The papers to be presented are the result of several years of research at sites impacted by the construction of the Coronado Power Station near St. Johns, Arizona. The problems of administration of a large research project are discussed, as are the research problems encountered in arbitrarily selected data samples. The results of research in Archaic settlement, lithic chronology, and Puebloan settlement and ecology in the Puerco River-Little Colorado River basin are discussed.

(43) TRACE ELEMENT ANALYSES OF CHERT: PROBLEM-ORIENTED RESEARCH. The papers in this symposium present the results, from several years of ongoing research across the country, of the "fingerprinting" of chert sources via various analytical techniques. In addition to the technique and analytical parameters, the uses of the various data sets are noted, with the emphasis on the delineation of, or solution to, specific archaeological/gearchaeological problems. The emphasis of these papers is on the problems and their delineation and solution rather than on the presentation of large amounts of technical data.

(48) CULTURAL RESOURCE INVENTORY AND THE MEASUREMENT OF UNCERTAIN IMPACTS. The USDI Bureau of Land Management has been required by court order to produce a total of 212 Environmental Statements on its domestic livestock grazing program by 1988. In Arizona this involves 13 statements encompassing 12.5 million acres. This environmental analysis requirement has put cultural resource inventory, evaluation, and sensitivity assessment on a radically accelerated schedule, and has called for considerable innovation in the application of sampling methods and analytical techniques. To date, three distinctive approaches have been taken in Arizona; this symposium examines each from both compliance and professional contribution points of view.

(49) INTERDISCIPLINARY STUDIES IN OTOMANGUEAN. The development of a culture area may be investigated from various perspectives. Archaeology provides insights into material culture, socio-political organization, and regional relationships. Historical linguistics reveals regional relationships; reconstructions of vocabulary reflect prehistoric culture. Ethnohistory and ethnography furnish more direct evidence for later periods. When focused on common problems, these disciplines form a powerful tool in the reconstruction of culture history. Otomanguean as a culture area has until recently been neglected, although significant contributions exist in various sub-areas. This symposium presents two overviews (linguistics and archaeology) and two specific examples of interdisciplinary investigation, with discussion by specialists from archaeology, linguistics, and ethnohistory.

ABSTRACTS OF PAPERS*

Ackerly, Neal W. (Arizona) MODELING MICROWEAR FORMATION: A FEASIBILITY STUDY BASED ON FRACTURE MECHANICS. Most experimental studies of microwear formation on lithics are of limited utility because the results cannot be extrapolated to other lithic assemblages. This results from the fact that raw materials are selected according to geological "type" classifications. Instead, the focus should be on lithological attributes that are critical in microwear formation. Regression analyses indicate that the mechanical properties of various rocks may be reliably estimated on the basis of the apparent specific gravity, apparent porosity, and hardness of specimens. The implications of this approach for developing models of microwear formation on the basis of fracture mechanics formulas are discussed. (25)

Ackerly, N. W. (see Sutro, L. S.) (38)

Ackerman, Robert E. (Washington State) ARCHAEOLOGY IN THE SOVIET FAR EAST: THE TADUSHA RIVER SITE. Research in 1976 at the Institute of History, Novosibirsk, USSR, focused on Paleolithic sites in eastern Siberia and the Soviet Far East. Special studies were made of the inventory of the Tadusha River site, Soviet Maritime District, excavated by A. P. Okladnikov in 1963 and 1968. The site has been seen as a link in the spread of an Upper Paleolithic core and blade industry from Asian shores to North America. The report will evaluate the site data, specifically the undescribed 1968 inventory, and attempt to place the industry into a technological and temporal perspective. (44)

Adams, E. Charles (Museum of Northern Arizona) ROOM SIZE AND ITS RELATION TO ROOM FUNCTION. Detailed maps and measured drawings of over 100 rooms in the historic Hopi village of Walpi have provided a wealth of architectural data. One intriguing relationship observed during this work was the apparent correlation between room size and room function. When plotted statistically, it was found that this relationship did exist and that one can predict with considerable accuracy the function or use of a room by simply measuring its size. Information on use of the rooms was obtained from informants living in, or born at Walpi. (38)

Adams, Karen R. (Eastern New Mexico) A NEW METHOD FOR QUANTITATIVELY EVALUATING WILD PLANT RESOURCES IN THE RIO PUERCO VALLEY OF NEW MEXICO. Wild plants growing in a site catchment receive scores based primarily upon ethnographic use. Scores for plants that meet daily needs (food, fuel) are weighted the heaviest. Food plant scores reflect dependency, seasonal availability, size of the plant part collected, and methods of collection and preparation. A final tally is compounded from all parts of a plant used. A high total score indicates a valuable resource. These plant scores are multiplied by the land area they once occupied surrounding on site. Unique site catchment scores are generated that facilitate quantitative comparison of site location. (47)

Adams, R. E. W. (Texas-San Antonio) RANK ORDERING, MAYA CENTERS, AND IMPLICATIONS. The application of a rank ordering technique to the problem of hierarchical relationships among Maya centers yields suggestive patterns. Numerical assessment is based on courtyard and acropolis counts, and supplementally on a volumetric assessment technique developed by ESR and NI Turner. Order of magnitude patterns allow implications as to hierarchical relationships, relative population densities, and dynastic stability. (27)

Adovasio, J. M. (Pittsburgh) PERISHABLE INDUSTRIES FROM HINDS CAVE. The manufacture of basketry and cordage at Hinds Cave is discussed in terms of process and product. The evolution of these industries throughout the occupational sequence is detailed and compared to developmental sequences elsewhere in Trans-Pecos Texas. Utilizing the Hinds Cave data on these two classes of perishable artifacts in conjunction with data from other sites in the region, a general developmental sequence for the two industries in question is generated for the entire Trans-Pecos Texas cultural province. (28)

Ahlstrom, Richard V. N. (Arizona) DENDROCHRONOLOGY OF THE HOPI PUEBLO OF WALPI: A PRELIMINARY INTERPRETATION. Four hundred and seventy tree-ring dates obtained during research associated with the restoration of Walpi permit several preliminary interpretations: (1) strong support for the Hopi tradition that the present Walpi Pueblo was founded soon after the

Pueblo Revolt of 1680; (2) earlier beams come from a village founded by A.D. 1400; (3) lack of dates between 1710 and 1880 results from sampling problems, lack of construction, or recent dismantling of upper story structures; and (4) many old structures were dismantled and new ones built between 1880 and 1940, reflecting changes in the use of Walpi and/or changes in Hopi life style. (30)

Aikens, C. Melvin (see Mehringer, Peter J., Jr.) (5)

Aldenderfer, Mark S. (Missouri-St. Louis) EMPIRICALLY EVALUATING MULTIVARIATE STATISTICAL METHODS: SITE TYPOLOGIES AND CLUSTER ANALYSIS. Although multivariate statistical methods are frequently used in archaeological research, few attempts have been made to evaluate the performance of these data sets with known structure. This type of evaluation is especially necessary where little or no theoretical justification for the use of any multivariate method exists, such as in archaeology. This paper presents a series of experiments designed to evaluate how well certain cluster analysis methods reconstruct site typologies based on functional attributes. Although the focus of the paper is restricted, it will be demonstrated that the results obtained show striking convergence with evaluation studies from different scientific disciplines on very different data sets, thus increasing the significance of the results. Pragmatic suggestions on the use of cluster analysis will be offered for a variety of archaeological situations that are likely to obtain in many applications. (15)

Allen, Lawrence P. (SUNY-Buffalo) INTRA-URBAN EXCHANGE AT TEOTIHUACÁN: EVIDENCE FROM MOLD-MADE FIGURINES. Among the items collected in the course of the Teotihuacán Mapping Project survey are a variety of mold-made figurines. This paper considers patterning in the distributions of two related classes of these, manufactured late in the city's history. Sets of figurines produced from a single mold can be identified. Patterns produced from a series of simulation models utilizing varying stipulations concerning the loci of figurine production, exchange, and utilization are compared with the characteristics of the actual arrangements of sets discovered in an attempt to estimate paths travelled by the products of a common mold to discard and ultimate collection. (21)

Altuna, J. (see Clark, G. A.) (34)

Amadeo, Rea (see Hamblin, Nancy L.) (3)

Ambler, J. Richard (Northern Arizona) THE SAN MATEO PROJECT SO FAR. Intensive survey in the area of San Mateo, northwestern New Mexico, has shown evidence of several thousands of years of occupation, with the most intensive utilization of the area occurring during the climatic optimums around the 1100's and early 1700's. These periods have been the subject of intensive excavations at a small Anasazi village and an early Navajo settlement. Architectural features, artifact analysis, and ecological/subsistence data are summarized, with emphasis on the intensive ceramic analysis and the data relating to subsistence patterns, and how the information gained to date affects our planning for future work. (38)

Anderson, Arthur J. O. A NOTE ON SAHAGÚN'S SPANISH TEXT. While usually the Spanish text of Sahagún's *General history* glosses and summarizes rather than translates the Nahuatl, the Spanish sometimes gives fuller information than the Nahuatl does. Such differences in the texts are of various kinds and may be variously explained. The texts are quite often complementary and are best so used. (16)

Anderson, Bruce (NPS) THE ANTIQUITIES ACT IN THE 10TH CIRCUIT COURT: FAILURE TO PROSECUTE DUE TO VAGUENESS. A recent attempt to prosecute an alleged violation of the Antiquities Act in the 10th Circuit Court failed in August, 1977, because of vagueness in the Act in general, and because of the *Diaz* decision in specific. The decision extends the vagueness interpretation into the 10th Circuit, whereas before it had affected only the 9th Circuit. The details of the case are presented and legislative means of coping with these difficulties are suggested. (12)

Anderson, Joseph K. (SIU-Carbondale) RESEARCH DEALING WITH ARCHAEO MAGNETIC DATING ON BLACK MESA. Two years of experiments with the use of archaeomagnetic dating procedures on Black Mesa are discussed. Types of samples taken, the procedures involved and the types of data extracted are dealt with. In addition, the use of this technique as both a dating tool and a method for understanding cultural variability at the intrasite and intersite levels is examined. (22)

Andrews, R. (see Adovasio, J. M.) (28)

Appel, Jill (Purdue) THE VALLEY OF OAXACA LATE POSTCLASSIC IN AN EVOLUTIONARY

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

PERSPECTIVE. This paper examines the Late Postclassic period in Mesoamerica in an evolutionary and regional framework. It is proposed that the Late Postclassic represents an evolutionary development partly determined by previous stages, but differing in the organization of production and exchange. Supporting data are provided by a comparison of political and economic organization in several regions, including the Valley of Oaxaca. (29)

Arundale, Wendy Hanford (Burke Museum) A PRELIMINARY SURVEY OF THE CAPE DORSET AREA, BAFFIN ISLAND, N.W.T., CANADA. This paper outlines the goals of the survey, presents some brief background on the area it covered, describes survey activities, and summarizes survey findings. Although famous for the original Dorset culture collection described by Jenson in 1925, the Cape Dorset area is poorly known archaeologically. This survey, conducted during August 1977, showed that prehistoric occupation of the area was quite dense. Site components ranging from PreDorset to modern were discovered. The survey prepared the way for future research in the area by obtaining local permission and cooperation, by familiarizing researchers with local conditions, and by confirming the area's suitability for paleoclimatic research based on pollen analysis. (11)

Autry, William O., Jr. (Vanderbilt) THE ROLE OF DOCUMENTARY SOURCES IN ARCHAEOLOGY: WHERE HAS ALL THE THEORY GONE? In recent years archaeologists have turned with greater frequency to certain types of documentary accounts—most often to put “flesh on the bare bones of prehistory.” Unfortunately, in many cases documents are employed in theoretically weak positions in the research, frequently in post-fieldwork explanatory roles rather than in an interactive research framework that permits feedback between the historical data and the archaeological fieldwork. Particular document classes are illustrated and critically evaluated for various levels of archaeological research. A multistage research design incorporating documents into all levels of archaeological research is proposed and evaluated. (6)

Ayres, Harvard (Appalachian State) THE GEOLOGY OF CHERTS—A GEOARCHAEOLOGIST'S VIEWS. Chert is defined as a cryptocrystalline to micro-crystalline rock, containing a very high percentage of silica. It forms in several different geological environments including primary depositional, secondary replacement, and hydrothermal. The environment of deposition may well be a key to the geochemistry. It seems likely that the elements found in cherts, other than silica, which allow the geochemist to differentiate them are due to the quantity and kinds of clays present. (43)

Bacon, Marlys (Texas-Austin) LOANWORDS IN OAXACAN CERAMIC TERMINOLOGY. The differentiation of the major language groups of the Otomanguean family occurred before the appearance of pottery in Mesoamerica. Potterymaking probably was not independently invented in each group, and terminology may have diffused along with techniques. Comparative analysis of contemporary pottery terminology from Oaxacan languages discloses loanwords for some form categories. Identification of the source and direction of borrowing provides information on the relative dominance of neighboring societies in the past. Previous linguistic studies in subgrouping, phonological history, and glottochronology allow the postulation of approximate time-depths and relative geographic locations of these linguistic borrowing-relations. (49)

Baerreis, David A. (Wisconsin-Madison) PALEOCЛИMATIC IMPLICATIONS OF GASTROPODS AT RODGERS SHELTER. Paleoclimatic interpretations based upon gastropod evidence have most commonly been based upon species changes in gastropod assemblages. The extremely broad range of many species can result in an erroneous appearance of environmental stability, as is perhaps the case in current interpretations of the Meadowcroft site, since only the extreme changes from glacial to interglacial result in range shifts of sufficient magnitude to be reflected in the stratigraphic record. Clinal variations in modern gastropod size are illustrated and used in conjunction with size variations over time at Rodgers Shelter to derive temperature and precipitation data for the archaeological sequence. (26)

Baird, Ellen Taylor (Nebraska-Lincoln) THE ARTISTS OF SAHAGÚN'S PRIMEROS MEMORIALES. It has commonly been assumed that the illustrations of the *Primeros Memoriales* were executed by Sahagún's native informants; however, the inclusion of elements of European style and form suggest that the artists were Sahagún's assistants, young native noblemen who had been educated in a humanistic, European manner by Franciscan monks. Analysis of the illustrations with respect to the styles of individual artists and the use of pre-Conquest or European form and style potentially reveals the identity of the artists. (16)

Baker, Charles M. (Georgia) MIMBRES-MOGOLLON LITHIC ASSEMBLAGE VARIABILITY. Substantive results of a study of the technological and formal variability of 80 Mimbres-Mogollon lithic assemblages from southwest New Mexico are presented. Site size as well as locational and environmental data are considered in an effort to explain the behavioral significance of observed interassemblage differences. (19)

Baker, Craig (SIU-Carbondale) THE USE OF NATURAL TOPOGRAPHIC DATA FOR PREDICTING SITE LOCATIONS: AN EXAMPLE FROM THE CENTRAL ARIZONA ECOTONE PROJECT. A method is proposed for use in describing the physical setting of sites within a region. An area is partitioned into a population of grid cells. A subpopulation of grid cells, surrounding each site is then used to define site locations. Results obtained through application of this method to an area in central Arizona are discussed. The effectiveness of this method in predicting site locations is evaluated. (15)

Baker, Larry L. (Eastern New Mexico) A NON-TYPOLOGICAL CERAMIC METHOD FOR FINE CHRONOLOGICAL DISTINCTION. Typologically derived ceramic data has not provided sufficiently precise chronological information for dealing with network exchange relationships in the Middle Rio Puerco Valley of New Mexico. Subsequently, a non-typological ceramic approach was developed incorporating attributes of vessel morphology. Various seriation techniques were utilized to evaluate the chronologic sensitivity of attributes within stratigraphic proveniences. Attributes that were initially defined as temporally sensitive were further investigated to test their correlation and/or independence. Various multivariate techniques incorporating independent temporally sensitive attributes were employed to order known stratigraphic proveniences at the intra- and intersite level. (6)

Ball, Hal C. (The Institute of Maya Studies) ARCHAEOLOGICAL INVESTIGATIONS AT LAMANAI, BELIZE. The Royal Ontario Museum of Toronto, Canada, has been actively engaged in archaeological investigations at the Maya site of Lamanai since January of 1973. This paper will summarize the results of excavations as of the end of the 1977 season, with emphasis on the structures located within the southern and central part of the site. (27)

Ball, Joseph W. (San Diego State) POLYCHROME POTTERY AND REGIONAL EXCHANGE IN THE EARLY CLASSIC NORTHERN MAYA LOWLANDS. Over the past half century, a repetition-hallowed model of Lowland Maya polychrome pottery production and distribution has developed which posits a southern Lowland—primarily northcentral Petén—origin for such decorated wares in combination with a literally rapacious northern Maya market. This model is examined in light of recent stylistic and non-analytical physical studies of third through seventh century A.D. polychrome decorated pottery from selected sites in the northern and southeastern Lowlands and an alternative reconstruction is offered. (21)

Bandy, Philip A. (Texas Tech) THE TECHNOLOGICAL RECONSTRUCTION OF A NORTHERN TEXAS LITHIC ASSEMBLAGE. The study of chipped stone tools has utilized various approaches that include interpretation of function, morphological classification, and replication. This paper reports a laboratory study that examined the manufacturing process responsible for the making of a prehistoric Texas assemblage. It reconstructs the lithic manufacturing technology using a combination of traditional descriptive analysis and chipping replication. A technological model or reconstruction was developed, then tested. This approach permits a refinement of interpretation heretofore not possible and is applicable to other lithic studies. The study assemblage represents the second of three distinct stages of manufacturing in the production of finished and partially finished artifacts for large-scale trade of Alibates flint. (25)

Banks, Larry (U.S. Army Corps of Engineers) PUBLIC ARCHAEOLOGY IN THE CORPS OF ENGINEERS. By planning interpretative development on civil works projects and on specific sites where such developments are warranted, the Corps of Engineers is attempting to provide a mechanism for expressing archaeological goals and the results of investigations to the general public. Four case studies are reviewed, successes and failures to date are discussed, and recommendations for cooperative agreements between participating parties are made. It is essential to give the public something in return for the amounts of money that have been and are currently being expended for archaeology on civil works projects. (18)

Bard, James C. (Lawrence Berkeley Laboratory) GREAT BASIN PETROGLYPHS: RELATIVE DATING BY NEUTRON ACTIVATION ANALYSIS. Recent investigations—conducted at the Lawrence Berkeley Laboratory—of desert varnish chemistry and nuclear measurements of petroglyph samples from the western Great Basin have shown that a relative dating system based on neutron activation and X-ray fluorescence analyses is feasible. Results of preliminary tests on selected petroglyphs from western Nevada confirm accepted chronological ordering of Great Basin petroglyph styles. (5)

Barrera Rubio, Alfredo (Yucatán) A STUDY OF SETTLEMENT PATTERNS IN THE UXMAL AREA, YUCATÁN, MEXICO. The results of a preliminary settlement pattern study in the Uxmal area are described. The study concentrated on the relationship of the civic-ceremonial center, which is enclosed by a wall, and the surrounding residential zones and their related features. Variable soil types and the absence of available water sources appear to be conditional factors in dis-

tribution of settlement zones. A close association was observed between high status architectural assemblages and *chultunes* or water reservoirs, suggesting that access to water storage units was a prominent aspect of the socio-political organization of the ancient Puuc center. (27)

Bartel, Brad (San Diego State) ARCHAEOLOGICAL OPERATIONALISM OF COLONIALISM AND IMPERIALISM: AN EXAMPLE FROM PROVINCIAL ROME. Archaeologists lack explicitly developed procedures for studying cultural processes of colonialism and imperialism. When dealing with state societies in economic and political contact with other cultures of various degrees of organizational complexity, it becomes necessary to distinguish patterns of ethnic boundary maintenance and the manner and extent of cross-cultural adhesion. The *limes* frontier zone of the Roman provinces of Pannonia and Upper Moesia present evidence, both archaeological and ethnohistorical, supporting a revised methodology for the study of colonialism and imperialism. Research conducted on urban and rural populations is presented, representing plural ethnic situations under different mechanisms of social control. (23)

Batcho, David (Arizona State) PRELIMINARY INVESTIGATIONS AT CHAVEZ PASS RUINS, COCONINO NATIONAL FOREST, ARIZONA. Chavez Pass Ruins, one of the largest prehistoric sites in the Southwest, is located in the Coconino National Forest, 30 miles southwest of Winslow, Arizona. It consists primarily of three large pueblo room blocks, extensive burial areas, and a number of associated features. A preliminary investigation of the site was carried out in July, 1977, by Arizona State University. Analysis of the recovered artifacts, including the differential distribution of ceramic and lithic material, is discussed, as well as evidence for temporal differences between the three pueblo units. Plans and suggestions for future work at the site are also discussed. (38)

Bawden, Garth (Harvard) THE SOCIAL CONTEXT OF MOCHE V CERAMICS. Studies of Moche pottery have been chiefly chronological and iconographic. A Moche V collection from the urban site of Galindo enables the study of the ceramics in their total cultural setting. Comparison of these data with early Moche and later Chimu ceramic styles indicates the probable nature of social development during these cultural periods. A trend toward increased social stratification, administrative centralization, and the rising importance of secular aspects of social integration is suggested by the Galindo pottery and its context. (9)

Bayham, Frank E. (Arizona State) A CONSIDERATION OF SPECIES ABUNDANCE AND SIZE ON ANIMAL EXPLOITATION. Subtle intra-regional variability was observed between faunal assemblages from archaeological sites within the Copper Basin region, west-central Arizona. By focusing on the attributes of species abundance and size in the prehistoric record, it was found that much of the variability could be expressed in terms of large to small mammal ratios. Lacking modern comparative biomass data, the attempt was made to derive ecological implications for these differences from models of optimal diet. These implications are evaluated for their potential to explain and predict. (47)

Beckes, Michael R. (Illinois State Museum) ARCHAEOLOGICAL RECONNAISSANCE IN THE SOUTHERN TULAROSA BASIN: MCGREGOR GUIDED MISSILE RANGE. Some results of a recent preliminary archaeological reconnaissance of McGregor Guided Missile Range in Otero County, New Mexico are presented. Cultural remains indicating aboriginal occupation of the study area from Folsom through Formative times are briefly discussed. Some general conclusions on the nature of long term cultural change within the study area are advanced. The potential significance of the cultural resources of the area, and specific directions for future research efforts are presented. Some specific operational problems encountered on this large magnitude cultural resource inventory and assessment project are outlined. (20)

Berry, Claudia (Museum of Northern Arizona) LITHIC ANALYSIS OF ASSEMBLAGES FROM NORTHEASTERN ARIZONA. This paper represents a progress report on the analysis of lithic material from preceramic and ceramic sites in northeastern Arizona. The large number of aceramic sites located along the Coronado Transmission Line has afforded an excellent opportunity for analyzing lithic assemblages in an area where little more than basic reporting has been done. In addition, selected artifacts from the Museum of Northern Arizona collections, representing over 100 other sites in the area, are being analyzed in order to set up a basic taxonomic system and more accurately define and describe the assemblages and technological entities that characterize the area. (42)

Bettinger, Robert L. (New York) ABORIGINAL FOOD PRODUCTION IN OWENS VALLEY, EASTERN CALIFORNIA. It is by now widely accepted that the Paiute of Owens Valley, California, engaged in the irrigation of wild plants to increase their yields. The details of food production in this locality, however, remain unclear with respect to: (1) the antiquity of irrigation; (2) causal explanations for its inception; (3) the role of food production in the subsistence economy; and, (4) the impact of irrigation on socio-political organization. Historic documents, ethnographic

accounts, and archaeological data shed light on these questions and suggest avenues for future research. (5)

Bird, Junius B. (see Turner, C. G., II) (17)

Bishop, Ronald L. (Brookhaven National Laboratory and Museum of Fine Arts) CERAMIC COMPOSITIONAL MODELING AT MAYA PALENQUE. An extensive program of neutron activation, petrographic, and x-ray diffraction analysis is focused on ceramics from the Classic Maya site of Palenque, Chiapas. This paste compositional approach to ceramic exchange produces an extensive data bank, suitable for several levels of interpretation. The modeling of short range, intensive exchange requires a rather precise determination of ceramic paste variability within the immediate vicinity of Palenque. Primary reliance is placed upon the chemical data. Selected examples of a "local" rather than a more "global" perspective on analytical data reduction illustrate special problems that may arise. (21)

Bisson, Michael S. (McGill) ZAMBIAN COPPER WORKERS REVISITED: A NOTE ON VARIATION IN ETHNOARCHAEOLOGICAL DATA. In 1960, a description of traditional copper smelting and refining techniques as practiced in northwestern Zambia was published by J. H. Chaplin. Twelve years later, the same group of informants demonstrated these techniques to the present author. This report describes both demonstrations and the differences that were observed between them. The significance of these observed variations are discussed in relation to archaeological evidence of copper smelting in the area and attempts to estimate the amount of copper produced at a nearby prehistoric mine. (44)

Blanton, Richard E. (Purdue) MONTE ALBÁN, OAXACA, MEXICO, PATTERNS OF URBANISM AT THE ANCIENT ZAPOTEC CAPITOL. Spatial analysis of architectural features, roads, and areas identified as workshops sheds light on the organization of the ancient city and its regional role. It is argued that Monte Albán was primarily an administrative, not economic, center during most of its history. (29)

Blifeld, Susan (UCLA) ATTRIBUTAL ANALYSIS OF SOLVIEUX BURINS. Chisel-ended tools termed *burins* often constitute the single most important lithic class in Upper Paleolithic artifact assemblages. The burin assemblages from the open-air site of Solvieux comprise some of the most interesting samples of these tools excavated in recent years in southwest France. The Solvieux burins provide an excellent body of data with which to test conventional approaches to artifact classification as well as to assess new methodologies of typological analysis. This paper summarizes a pilot study of the Solvieux Magdalenian I burin assemblage conducted with a quantitative attributional approach designed to monitor formal variability peculiar to burin populations. The results of this study and its potential significance to method and theory of lithic artifact typology are discussed. (34)

Bohrer, Vorsila L. (Eastern New Mexico) A NON-PALYNOLOGICAL METHOD OF RECONSTRUCTING VEGETATION ON THE HEAVILY OVERGRAZED RÍO PUERCO VALLEY OF NEW MEXICO. Seven major steps are followed in reconstructing heavily overgrazed vegetation. (1) Collect, identify, and understand the modern species. (2) Accumulate lists of plant species (inventories) growing on each example of a landform. (3) Classify each species as an increaser or decreaser with grazing. (4) Seek verification from travel accounts, floristic studies of adjacent areas, historic literature, etc. (5) For decreasers, determine the range of landforms once occupied by reference to landform inventories. (6) For increasers, determine former optimal landforms for food collecting through ecological data. (7) Evaluate other factors (fire, disturbance). (47)

Bove, Frederick J. (UCLA) TREND SURFACE ANALYSIS AND THE LOWLAND CLASSIC MAYA COLLAPSE. The methods of trend surface analysis, a form of regression analysis, are applied to complex archaeological surfaces derived from a series of points representing the most recent dated, carved stone monuments in the Lowland Maya region. Examination of trend surfaces of up to the 6th degree of polynomial, an analysis of variance, and maps of the residuals, demonstrate the utility of the technique. Results of the analysis shed further light on the processes involved in the collapse of the Classic Lowland Maya. (27)

Bowen, William R. (see Dickens, Roy S., Jr.) (7)

Bradford, James E. (Museum of Northern Arizona) THE NATURE OF ARCHAEOLOGICAL TRANSECTS IN REGIONAL STUDIES, PART II. The Museum of Northern Arizona has intensively studied 47 archaeological sites impacted by the construction of the Colorado Power Station railroad spur that runs between the Puerco River valley and the Little Colorado River valley. The peculiar, purposeful transect nature of the project presents advantages and disadvantages in the interpretation of archaeological data on a regional scale. Part II discusses the actual data

recovered on the railroad project, and its relationship to the theoretical and methodological problems presented by a regional transect. The discussion will center on specific classes of recovered data from several selected sites.(42)

Braley, Chad O. (Florida State) ARCHAEOLOGICAL TESTING OF THE BAY PINES V.A. HOSPITAL SITE, ST. PETERSBURG, FLORIDA. A multi-component mound-midden site, 8 Pi 64, is located on the Bay Pines V.A. Hospital grounds on Boca Ciega Bay in St. Petersburg, Florida. A portion of this site was tested by Florida State University for a period of six weeks. The area was augered, noting the presence or absence of midden areas and a topographic map was completed. Twenty-seven units were excavated, with 12 units being placed in the midden. Material goods and archaeological features were scarce, but valuable data concerning Archaic dietary and seasonal settlement patterns was recovered. On the basis of frequency of migratory shellfish (scallops), seasonal site usage is suggested.(46)

Brenner, Mark (see Deevey, E. S.) (10)

Breternitz, Cory D. (Arizona) DENDROARCHAEOLOGY OF THE JOHNSON CANYON CLIFF DWELLINGS, SW COLORADO. Nine Mesa Verde Branch cliff dwellings on the Ute Mountain Indian Reservation were mapped and 461 tree-ring samples were collected in 1974. Two clusters of cutting dates consistently occur at the sites—one in the middle 1100's and another in the early 1200's. Implications of the date clusters are discussed. The tree-ring specimens provide insights into cultural patterns through the identification of beam re-use, differential use of species, seasonal cutting activities, and use of parts of the same tree in different structures. Identification of wood species also permits some inferences about the prehistoric environment. (30)

Bricker, Harvey M. (Tulane) RECENT RESULTS OF ARCHAEOLOGICAL AND PALEOENVIRONMENTAL RESEARCH AT LES TAMBOURETS. Les Tambourets (Commune de Couladère, Haute-Garonne) is a large, open-air Châtelperronian site in the Petites-Pyrénées region of southwestern France. The Tulane University excavations of 1973 and 1975 have produced an assemblage sample of clearly Upper Paleolithic aspect. The relatively late dating suggested by the typology is corroborated by the geochronologic data developed by the paleoenvironmental research carried out at the Institut du Quaternaire of the Université de Bordeaux I. The paper will summarize current archaeological, sedimentological, and palynological results. (34)

Bridges, Sarah (see Rothschild, N.) (35)

Bronitsky, Gordon J. (Texas-Permian Basin) TECHNOLOGICAL INNOVATION AND POPULATION PRESSURE. Research conducted at Arroyo Hondo, a late prehistoric Pueblo site near Santa Fe, New Mexico, tested hypothesized relationships between increased population density and technological innovation. Significant changes occurred in three realms: increasingly effective agricultural technology, attempts to minimize food waste, and rescheduling of some activities away from seasons of peak agricultural labor input. (45)

Brooks, Mark (South Carolina) A STRATEGY FOR DETERMINING THE EXTENT AND VARIABILITY OF ARCHAEOLOGICAL SITES IN TEMPERATE FOREST LOCALITIES. Our problem concerned determining the extent and variability of artifactual deposits on a heavily forested ridge in coastal South Carolina (Huger Site, 38BK211). To gain a representative sample and minimize costs, we developed a subsurface testing procedure using a stratified unaligned sampling strategy. The ridge was divided into 4 microtopographic areas and 100 test pits proportioned according to the percent area of each of these areas. A series of maps was generated from the excavated material to form the basis for subsequent excavation design. The paper discusses and evaluates the practical and methodological aspects of the sampling strategy. (13)

Brooks, Richard H. (Nevada-Las Vegas) CRANIAL DEFORMATION: POSSIBLE EVIDENCE OF POCHTECA TRADING MOVEMENTS. The archaeological significance of the limited occurrence in the Greater Southwest of skulls with tabular oblique deformation may provide evidence of individuals traveling and trading from Nuclear Mesoamerica. The implications of these finds may relate to the movements of pochtecas into the northwestern frontier along a trading corridor of the Sierra Madre Occidental. The inference is that skulls with tabular oblique cranial deformation are evidence of individual pochteca in an area outside of Nuclear Mesoamerica. (37)

Brooks, Richard H. (see Brooks, S. T.) (31)

Brooks, Sheilagh T. (Nevada-Las Vegas) ARCHAEOLOGICAL TECHNIQUES APPLICABLE TO FORENSIC INVESTIGATION. Techniques utilized in archaeological survey and excavation are applicable to forensics. Walking transects and recording objects through establishing a grid system could be vital in forensic search investigations. Photographing items *in situ* within this

delineated grid system provides a means of recording evidence encountered during search procedures. Excavation by controlled vertical and horizontal units, and methods of archaeological recovery of skeletal materials are particularly appropriate for forensic investigations. The teaching of archaeological survey and excavation techniques is part of a developing cooperative program between the Anthropology Department and the Criminal Justice Program at the University of Nevada, Las Vegas. (31)

Brooks, Sheilagh (see Brooks, R. H.) (37)

Brown, David L. (Washington-St. Louis) THE INTEGRATION OF ANDEAN TIWANAKU WITH ITS HINTERLANDS. The second period of Andean empires is characterized by two competing states—Wari (A.D. 500-800) and Tiwanaku (A.D. 400-1000). The different general patterns of organization that we can reconstruct, with the Wari mainly dependent upon military coercion as contrasted to the apparently more egalitarian economic interdependence of the Tiwanaku federation, helps to explain both their differing rates of expansion and their life-span. With the collapse of Wari, we can document a shift in the altiplano-based Tiwanaku organization, with expansion into the Pacific coastal areas previously on the Wari frontier, and simultaneous new interactions with the Amazonian *yungas* corn-producing areas. (23)

Brown, Galen N. (NPS) ECOLOGICAL MAPPING FOR PURPOSES OF SAMPLE STRATIFICATION IN LARGE-SCALE CULTURAL RESOURCES ASSESSMENT. Both Federal policy and archaeological practice have often called for "inventory survey" as a viable first stage in cultural resources management efforts. As assessment and conservation efforts increase in number and especially in size, however, it becomes apparent that finding each site is impossible. Nonetheless, some idea of the nature and distribution of sites is necessary for the planning of subsequent mitigation, conservation, and research. This problem can be solved through the application of a multi-stage sampling design based on environmental stratification. Remote sensing methods, which provide an efficient means of such regional stratification, will be discussed. (24)

Brown, Patricia Eyring (see Rogge, A. E.) (15)

Bruhns, Karen O. (San Francisco State) COMMERCIAL AGRICULTURE IN THE POSTCLASSIC: A VIEW FROM EL SALVADOR. Recent investigations at Cihuatán, a terminal Classic/early Postclassic site in northeastern El Salvador, have indicated that a major cause of the origin and flourishing of the site may have been participation in the extensive long distance trade network of Postclassic Mesoamerica. The evident ties of Cihuatán with both Mesoamerican and Lower Central American cultures raises new questions about participation in the late pre-conquest cultural and economic sphere and especially about the mechanics of the Mesoamericanization of the southern frontier at this time period. (32)

Bryant, Vaughn M., Jr. (Texas A & M) A FOSSIL POLLEN RECORD FROM HINDS CAVE, TEXAS. Fossil Pollen records from Hinds Cave can now be integrated into the other existing pollen records from southwest Texas to reveal a vegetational record of both stability and change during various periods from 12,000 years ago to the present. The Hinds Cave record differs slightly from the existing pollen records for the area and can be correlated with other data from the shelter pertaining to diet and economic use of plants. The pollen record suggests an early beginning date for the semi-arid vegetational pattern currently found in the Lower Pecos region. (28)

Burns, Bruce A. (see Baker, Larry L.) (6)

Burns, Bruce A. (see Terrel, J. A.) (15)

Busby, Colin I. (California-Berkeley) RECENT ARCHAEOLOGICAL RESEARCH IN SOUTHEASTERN NEVADA: GARDEN AND COAL VALLEY REGION. During the period 1975-77, field parties from the University of California – Berkeley have conducted a program of archaeological reconnaissance and excavation in Lincoln and Nye counties, southeastern Nevada. Five cave/rock-shelter sites have been excavated and over 70 surface sites recorded. Preliminary results indicate short-term, temporary utilization of the region from ca.6,000 B.C. (Western Pluvial Lakes Tradition) to contact times (Shoshone, Southern Paiute). Results of this research are discussed within the broad frame of both Great Basin and southeastern Nevada prehistory. (5)

Bussey, Stanley D. (New Mexico State) THE SMALL CONTRACT AS RESEARCH. In contract archaeology the small project—such as a single drilling location or a few hundred feet of pipeline—has generally been regarded as having no research potential because of the limited scope and low budgets of such projects. In fact, if proper planning and attitudes exist, the small

project can be a valuable, if limited, part of a regional research design. The factors that affect the research potential of the small project are attitude, planning, and the ethics of contract archaeology. (39)

Butler, Robert (see Elighmy, Jeffrey) (6)

Buttigieg-Berman, Mary Jane (New Mexico State) THE SMALL-SCALE SURVEY REPORT: CREATION OF A DATA BASE. The small survey report must accommodate the needs of several audiences. Too often, the requirements of one party overshadow those of contract-based, research-oriented archaeology. As a consequence, the small survey report is a poor source of data, and its utility as a research document is nonexistent. This problem can be overcome if the small-scale survey would address itself to questions related to subsistence and settlement behavior. A report format formulated both to provide the necessary data required by this general framework, and designed to yield information needed by those involved in planning and management, is presented. (39)

Byrd, Kathleen M. (LSU) ARCHAEOLOGICAL DATA RELATIVE TO PREHISTORIC SUBSISTENCE IN THE LOWER MISSISSIPPI ALLUVIAL VALLEY. Man has inhabited the Lower Mississippi Valley for at least 12,000 years. During that time he has relied upon many different foods, both wild and domesticated. The types of these foods and their importance has changed through time. Wild plant foods were always important, but the reliance on the tropical cultigens—squash, corn, and beans—increased during the late prehistoric times. Native domesticated plants, for example the sunflower, were also cultivated. Animals played an important role in prehistoric subsistence, especially the larger, common species. The Paleo-Indians used the spear to kill their game. The Meso-Indians relied on the atlatl, in addition to the spear. And the Neo-Indians adopted the bow and arrow as well. (46)

Canouts, Velella (SIU-Carbondale) UPLAND ARCHAEOLOGY: AN EXAMPLE FROM SOUTHERN ILLINOIS. Data recovered on a reconnaissance survey suggest that hunting and gathering populations occupied the Shawnee Hills in a year-round, seasonal pattern of exploitation. It is expected that the higher density associated with fall resource exploitation is the result of the combined exploitative activities of groups adapted only to the uplands and groups adapted to both the lowlands and uplands. The pattern of sustained year-round habitation of "hill people" has implications for the study of cultural isolates and cultural conservatism. (35)

Canouts, Velella (see Gould, R. A.) (38)

Cantwell, Anne-Marie E. (Rutgers-Newark) HOPEWELL REDUX: PATTERNS OF CHERT USE DURING THE HAVANA TRADITION. Current explanations of the Hopewell Interaction Sphere stress the exchange of rituals, as well as sociotechnic and ideotechnic artifacts and their raw materials, among the participating traditions. However, an analysis of two early Havana Tradition sites in the central Illinois Valley shows that exotic cherts were imported for the manufacture of technomic artifacts, such as lamellar flake blades, because these cherts possessed the requisite structural qualities lacking in the abundant, coarse-grained, fossiliferous, local cherts. Models for Hopewellian trade should, therefore, be expanded to include the exchange of subsistence related goods. Shifts in chert use in late Havana times are discussed and related to the collapse of the Hopewell Interaction Sphere. (35)

Casjens, Laurel (Harvard) APPROACHES TO SITE DISCOVERY. The paper evaluates various archaeological approaches used by the Institute for Conservation Archaeology, Harvard University. Methodology includes surface and subsurface techniques, remote sensing procedures, and literature research. The statistical use of such techniques is discussed in relation to current trends in general archaeological theory. Methodology is further evaluated in terms of the efficacy of techniques in resolving the various specific problems of agency-sponsored archaeological projects within a cost-effective framework. (13)

Cassells, E. Steve (Judson College) THE JUDSON COLLEGE SITE: A LATE ARCHAIC CAMP IN NORTHERN ILLINOIS. Excavation at the Judson College Site, Elgin, Illinois, carried on since the spring of 1976, has revealed a shallow occupation at a date no earlier than 3,000 B.P. The seasonal camp is on a Pleistocene terrace of the Fox River. Associated artifacts include Durst Stemmed and Raddatz Side-Notched projectile points, other utilitarian camp tools, and large quantities of debitage. A computer study of the debitage is currently underway, seeking to identify flint knapping idiosyncrasies of individual tool makers. (35)

Casteel, Richard W. (Simon Fraser) FEDERAL GOVERNMENT SUPPORT OF ARCHAEOLOGY IN THE UNITED STATES: 1946-1977. The National Park Service continues to be a major source of funding for American Archaeology, providing about 3 times the amount of money provided by the National Science Foundation and about 6 times that provided by the National Geographic

Society. Nevertheless, this program accounts for only about .00055% of the federal budget. Analysis of the funding pattern indicates that since 1963 there has been a general decrease in the amount of deflated funding available through the National Park Service, and that since 1973 the decrease has been precipitous. Implications of this funding pattern are discussed. (12)

Catlin, Mark (SIU-Carbondale) THE FUNCTION OF LIMITED ACTIVITY SITES IN PREHISTORIC SUBSISTENCE SYSTEMS ON BLACK MESA. Either implicitly or explicitly past archaeological studies have used site assemblages and site locations as indicators of the kind and amount of activities conducted at sites. Both of these indicators are explicitly used in testing how limited activity sites functioned in prehistoric subsistence systems in the highlands of Black Mesa. (22)

Chase, Philip G. (Arizona) QUANTITATIVE INFERENCES BASED ON POTTERY FRAGMENTS. A specially made sample of pottery was used to experimentally test the validity of the use of sherd counts and various alternatives for archaeological inference. Sherd counts proved unreliable, but three alternative methods appear to be statistically valid. (15)

Christenson, Andrew L. (UCLA) EXPLAINING CHANGES IN THE FOOD NICHE OF HUMAN POPULATIONS. Unlike many other animals, man is able to make radical and permanent changes in his food niche. Such changes are the result of decisions about food procurement and consumption. In this paper, major changes in the width of the human food niche (e.g., the broad spectrum revolution) are explained using an optimization model developed by Earle and Christenson. Current ecological models of foraging behavior and optimal diet are also considered. (36)

Clark, G. A. (Arizona State) THE LA RIERA PALEOECOLOGICAL PROJECT (ASTURIAS, SPAIN): AIMS AND PRELIMINARY RESULTS. Excavations at the stratified cave site of La Riera are central to an understanding of intraregional variability in human adaptation to the Cantabrian zone during the late Pleistocene/early Holocene (20,000-8,900 B.P.). Preliminary results document: (1) the presence of dense "living floors" with associated features, (2) patterns of lithic and bone artifact variability that cross-cut traditional culture-stratigraphic units, (3) marked variation in the incidence of faunal debris categories (body parts), suggesting differential treatment of different species and variation through time linked to shifts in site function, (4) a long-term increase in the exploitation of shell-fish, and (5) evidence for major late/Post-Pleistocene climatic changes. (34)

Cohen, Mark N. (SUNY-Plattsburgh) CARRYING CAPACITY, PERIODIC RESOURCE FAILURE, AND THE REGULATION OF PLEISTOCENE POPULATIONS: A CRITIQUE OF SOME RECENT MODELS. Ethnographic data suggest that the impact of environmental fluctuations on human populations is governed by socio-political variables affecting a group's ability to adjust to environmental change. Archaeological data suggest that early Pleistocene societies were well buffered against periodic shortages. Famine is probably a recent phenomenon among hunter-gatherers. The importance of crises in calculating carrying capacity and their importance as population limiting devices in the Pleistocene have both been overplayed in the recent literature. The deterioration of socio-political homeostatic devices in the late Pleistocene may explain the emergence of trade in luxury goods as a means of regenerating homeostatic social networks. (36)

Cone, Gerald (Wisconsin-Milwaukee) COMPUTER AIDED ANALYSIS OF CERAMICS FROM THE PUEBLA PRECLASSIC PROJECT. In recent years the Puebla Preclassic Project has recovered well over 100,000 ceramic artifacts from intensive site survey and from test excavations of five sites. We suggest that the span represented by these ceramic artifacts covers the Middle Preclassic period to the Late Classic period. It was decided before fieldwork was begun that only a cursory subjective typology would be attempted in the field, and that a computer aided analysis would be done at the University of Wisconsin-Milwaukee. All sherds were coded for computer aided analysis. The analysis is now in progress and some methods and results will be discussed. (40)

Conklin, William J. (Institute of Andean Studies) MIDDLE HORIZON TEXTILE TECHNIQUES. The characteristic structural forms of Sierra and Coastal weaving during the Middle Horizon are reviewed, as are the characteristic dye colors utilized by different cultures during this time period. These established diagnostics then permit a review of a textile fragment, found by Max Uhle at Huaca del Sol, that has been attributed to the Huari Culture. (4)

Connors, Deborah T. (see, Skinners, S.A.) (18)

Cooke, Richard G. (Smithsonian Tropical Research Institute) THE WHITE-TAILED DEER IN PREHISTORIC PANAMA: AN HYPOTHESIS FOR THE MANIPULATION OF WILD POPULATIONS IN

THE NEOTROPICS. Following the demise of the Pleistocene megafauna, the largest palatable terrestrial mammals that were available to the prehistoric inhabitants of Central America were the tapir, the white-lipped peccary, and the white-tailed deer. While the tapir and peccary require heavily forested habitats and rapidly move off in the face of human pressure, the last named is well-known to thrive in disturbed, man-made habitats and to be able to resist heavy and constant hunting pressure. In Central Panama (Coclé), where the population of hunter-gatherers and, later, sedentary agriculturalists increased rapidly from about 5000 B.C. to 1500 A.D., evidence from archaeological middens and ethnohistoric sources indicates that the white-tailed deer was exploited intensively and in similar proportions throughout this period, without a significant decline. An hypothesis is presented for the artificial manipulation of the white-tailed deer in this area, and some theories regarding the lack of domestication in the Neotropics are considered in light of this evidence. (32)

Coombs, Gary (California-Santa Barbara) **DECISION THEORY AND SUBSISTENCE STRATEGIES: SOME THEORETICAL CONSIDERATIONS.** There has been considerable debate concerning the utility of Mathematical Decision Theory, which includes Game Theory, as a framework for understanding the specific subsistence strategies adopted by various human populations. Much of this debate revolves around two related questions: (1) whether it is acceptable to treat the environment as a rational adversary, and (2) whether it is useful to approach problems involving *population* behavior from the level of the rational *individual*. This paper attempts to demonstrate that regardless of the answers to these questions, Decision Theory provides a number of valuable insights to the study of human subsistence behavior. (36)

Coulson, Sheila (see Flataker, C. S.) (34)

Covert, Herbert H. (see Seck, Susan M.) (5)

Cowan, C. Wesley (see Ford, R. I.) (22)

Curran, Margaret (Purdue) **AN EXAMINATION OF THE RELATIONSHIPS BETWEEN AGRICULTURAL PRODUCTIVITY AND POPULATION DENSITIES USING SATELLITE DATA.** According to some theorists, population pressure on agricultural resources is a major factor in the evolution of complex societies, but to date no researcher has been able to demonstrate this empirically. This paper discusses this problem and also a method—the use of LANDSAT data—which can produce highly accurate calculations of agricultural productivity that can then be compared with available information about the change through time in population densities in the Valley of Oaxaca. (29)

D'Altroy, Terence N. (UCLA) **THE EFFECTS OF INCA EXPANSION IN THE UPPER MANTARO VALLEY, PERU.** This paper examines the Incalcic militaristic expansion and incorporation of the Upper Mantaro region in the Central Highlands of Peru. During the Late Intermediate Period, just prior to incorporation, the Mantaro region was characterized by hierachical social organization and intergroup warfare. Data derived from the preliminary stage of a regional research project, using intensive surface collection, site mapping, and limited excavations, address the following issues: (1) how the local stratified society was incorporated into the interregional organization of the Incalcic state; and (2) what the effects were on local social and economic organization of an imposed peace. (23)

Davidson, Howard M. (Arizona State Museum) **AN EXAMPLE OF MULTI-STAGE RESEARCH WITHIN A CULTURAL RESOURCE MANAGEMENT FRAMEWORK.** The Arizona State Museum has investigated 183 km of transmission line corridor and ancillary facilities such as power generating substations and access roads for a southeastern Arizona utility. Multi-stage research conducted within a cultural resource management framework identified 116 archaeological sites; 35 of these were subjected to intensive data recovery. As sponsor planning, design, and construction phases for the various facilities overlapped, the Museum was able to integrate research formulation, resource identification, mitigation recommendation, and systematic data recovery and analysis stages into the contractor's schedule. Flexibility on the part of both institutions facilitated engineering and research revisions. Project management and research aspects are presented and evaluated. (12)

Davidson, Howard M. (see Dickerson, J. L.) (19)

Davidson, Howard (see Kosakowsky, L.) (25)

Davis, Emma Lou (Great Basin Foundation) **USE OF TETHERED BALLOON PHOTOGRAPHY FOR ANALYZING PALEOAMERICAN SITES: A CHINA LAKE EXAMPLE.** Correlations of aerial photography with "ground truth" require use of numerous media. Judicious combinations will supply both large overviews and also precise measurements. Both are essential for interpreting

prehistoric in the context of changing environments. Use of a tethered balloon as camera platform is described as an ideal medium for documenting ground truth at intermediate altitudes from 5 to 300 meters above terrain. Balloon based pictorial sequences fill a gap between satellite photos, high altitude stereo pairs, and precise, ground measurements mapped on a plane table. (11)

Deeds, Eric E. (see Kus, J. S.) (17)

Deevey, Edward S. (Florida State Museum) **CLASSIC MAYA IMPACT ON A LACUSTRINE ENVIRONMENT.** Phosphorus fluxes from watershed to closed lake to sediments allow evaluation of Maya impact on the lacustrine ecosystem of Lakes Yaxha and Sacnab. Settlement, and perturbing population and agroengineering forces, determined archaeologically, were nearly two times greater in the Yaxha sub-basin. Preliminary evidence suggests that Phosphorus flux, measured as net output to sediments, was sharply accelerated by human exploitation, more sharply in the Yaxha sub-basin. As Phosphorus is neither recycled atmospherically nor exported from the basins, deductions from fully parametrized models of Phosphorus flux can be used to clarify feedback terms in more complex models of other nutrients. (10)

Dekin, Albert A. (SUNY-Binghamton) **SPATIAL THEORY AND THE EFFECTIVENESS OF SITE EXAMINATION IN THE NORTHEAST.** For the last year, we have worked to provide an empirical base for maximizing inferences from minimal data on site character and content. We have evaluated several categories of test data to several areal scales in order to determine and to test mathematical models that interrelate them. While these approaches have resulted in cost-effective refinements in our research strategies, they have raised several questions of spatial theory and of the assumptions that underlie traditional approaches to site examination and evaluation. This paper briefly examines several of these problems as necessary theoretical background to further discussions of research methodology. (13)

Del Bene, Terry (Connecticut) **MICRO-DISTRIBUTIONAL ANALYSIS IN THE EXAMINATION OF LITHIC ACTIVITY.** An experiment has been performed in order to explicate the systems operant in the production of archaeological proveniences within the context of stone tool manufacture. An experienced knapper produced a series of tools, unaware that such an experiment was taking place. Finished tools and blanks were removed and a 100% recovery excavation was undertaken. The entire matrix within an area of 3 by 2.5 meters was collected to a depth of 1 cm. Both macro and micro distributional analysis was accomplished using the trend surface analysis option of the SYMAP V mapping program. (19)

DePratter, Chester B. (Georgia) **ARCHAEOLOGICAL IMPLICATIONS OF HOLOCENE GEOMORPHOLOGIC AND EUSTATIC CHANGES ON THE GEORGIA COAST.** Distribution of archaeological sites on Holocene portions of the Georgia (U.S.) coast permits delineation of six shoreline positions dating between 4500 and 100 years before present. Patterns of shoreline progradation indicate that configuration of the Georgia coast is the result of alternating cycles of deposition and erosion over the last 4500 years. Previously unrecorded fluctuations of sea level were also detected. Such changes would have resulted in wholesale shifts in the environmental setting of aboriginal populations. Implications for settlement and subsistence studies in dynamic coastal areas are discussed. (46)

Deraga, D. (see Winter, M.) (49)

Dering, Phil (Texas A & M) **POLLEN AND PLANT MACROFOSSILS FROM HINDS CAVE, SOUTHWEST TEXAS.** An analysis of plant macrofossils from a dry rockshelter in southwest Texas is presented. The results of the analysis are used to describe prehistoric utilization of plant resources and to infer prehistoric vegetation that occurred in the area. Since the lower deposits of the shelter have been radiocarbon dated to 11,000 B.P. the study represents the longest plant macrofossil and pollen record to be reported from southwest Texas. (28)

Dering, Phil (see Bryant, V.M., Jr.) (28)

Deutchman, Haree L. (SIU-Carbondale) **THE DISTRIBUTION OF TUSAYAN WHITE WARE AMONG THE KAYENTA ANASAZI.** Sosi Black-on-white and Dogoszhi Black-on-white co-occur at many Kayenta Anasazi sites. An elemental and trace element analysis of these two types from Black Mesa, Arizona, and surrounding areas is designed to define the range of paste compositional variability of these two types. It is suggested that there exist chemical and mineral differences between the ceramics from Black Mesa and its neighboring region. Alternative patterns of prehistoric raw resource procurement and the subsequent redistribution of pottery among these local prehistoric communities will be discussed. (21)

Dibble, David S. (Texas-Austin) THE INFIERNO PHASE: EVIDENCE FOR A LATE OCCUPATION IN THE LOWER PECOS RIVER REGION, TEXAS. Direct archaeological evidence of late prehistoric occupation in the lower Pecos-Devils River drainages (roughly coterminous with the present northeastern Chihuahuan Desert margin) has been limited. Most of the data available from the region are interpreted as indicating general continuity in adaptive patterning throughout middle-to-late prehistoric times. Recently, however, an extensive site in the lower Pecos valley has been briefly investigated and is hypothesized to reflect a late prehistoric occupation in the region by hunting groups of significant size; further, a hypothesis regarding a late period intrusion into the area by Athabascan speakers is presented on the basis of the new archaeological evidence. (35)

Dibble, Harold L. (Arizona) PATTERNS OF SHAPE IN FLAKES FROM THE TABUN CAVE, ISRAEL. Samples of complete, unretouched flakes from the Middle and Lower Paleolithic industries of Tabun are examined with respect to a number of quantitative attributes, while maintaining stratigraphic as well as technological controls. The temporal differences observed in these variables suggest that considerations of function and style alone are not enough to explain Paleolithic industrial variability, and instead such differences may be due in part to differential capabilities of evolving hominid groups. (44)

Dickens, Roy S., Jr. (Georgia State) PROBLEMS AND PROMISES OF URBAN ARCHAEOLOGICAL SURVEYS: THE MARTA PROJECT. The urban setting presents a variety of problems in the execution of archaeological surveys and assessments, while it also provides a promising and perhaps unique set of resources. Using the MARTA (Metropolitan Atlanta Rapid Transit Authority) Archaeological Project as an example, this paper describes and evaluates some of the techniques developed for survey in a large urban center. Sampling, testing, recording, and mitigation procedures are discussed. Potential theoretical uses of the urban archaeological resource are also considered, with an emphasis on pattern delineation, processual studies, and hypothesis testing. (7)

Dickerson, Jeanette L. (Arizona State Museum) A MULTISTAGE LITHIC ANALYSIS OF MATERIALS FROM SOUTHEASTERN ARIZONA. Archaeological data recovery in southeastern Arizona resulted in the collection of chipped stone artifacts from thirty-five sites. Formal attributes of artifacts were recorded and subjected to computerized statistical analyses in an attempt to achieve the following goals: (1) thorough description of lithics, (2) identification of technological and/or cultural traditions, and (3) identification of variability in aboriginal land use. Microwear and replicative studies lent further lucidity to site activities. As a result of the multistage analyses, formal variation within and between samples was isolated, and explanations for such variation offered in the form of temporal, cultural, and resource differences. (19)

Dickson, D. Bruce (Texas A & M) TIKAL, MILPA AGRICULTURE AND POPULATION: A SIMULATION. Archaeological estimates of the size of the prehistoric sustaining area and the population of the Classic Maya site of Tikal are reviewed. A computer simulation of the productivity of the presumed Tikal-sustaining area is made using data on corn yields, fallow cycles, acreage requirements, and per capita corn consumption collected among modern Maya *milperos* in the Peten. A large discrepancy is found to exist between the magnitude of the population estimated for the site and the number of people who could have been supported in its sustaining area if *milpa* agriculture had been the main prehistoric subsistence strategy practiced there. Alternative or supplemental food-energy sources are noted. (27)

Diggs, Robert D. (Northern Arizona) PREHISTORIC EXPLOITATION OF A MICROENVIRONMENT IN EAST CENTRAL ARIZONA. The following report represents the preliminary study of the Hall Ranch locality in east central Arizona, located 11 miles north of Springerville, Arizona on the ranch of Mr. and Mrs. Ralph Tuckness. Three occupations are represented: (1) Archaic, (2) Pueblo-Mogollon between A.D. 700 and 900, and (3) Pueblo-Mogollon between A.D. 1050 and 1100. The aim of the study is to describe the groups that occupied the locality and how the locality was utilized by the prehistoric occupations. (38)

Dincauze, Dena F. (Massachusetts-Amherst) PREDICTING RELATIVE SITE DENSITIES: TWO TECHNIQUES FOR LANDSCAPE ANALYSIS. This paper reports on complementary methods that show considerable potential for reliable prediction of relative site densities in advance of field investigations. First, data on soil permeability and surface slope, in combination, have proven to be a sound basis for stratifying terrain into units that can be ranked for probability of site encounter. At a larger scale, stream basins ranked by the Strahler method display positive (but not simple) correlations with observed site frequencies per stream unit length. These predictive methods promise greatly increased efficiency in the planning of survey activities in the selection of search methods appropriate to different kinds of terrain. (13)

Di Peso, Charles C. (Amerind Foundation) THE HOHOKAM AND THE OOTAM. For two decades Di Peso has proposed that the Upper Pima and Papago of Pimeria Alta were part of an older Ootam cultural continuum going back to a common indigenous Cochise Culture origin. This concept involves a culture conquest model with groups of indigenous Chichimecan folk, at various times in their history, put upon by alien or donor cultures such as the Hohokam. This disposition permits archaeologists to separate physical traits and attributes of indigenous groups from those of alien groups in order to trace artifact designs in terms of such control parameters as time and space and to reconstruct local history. (8)

Dodge, William A. (Chicago) ARCHAEOLOGICAL INVESTIGATIONS AT KYAKI:MA, ZUNI INDIAN RESERVATION. An archaeological survey of the area around the historic Zuni village of Kyaki:ma was recently conducted by the Zuni Archaeological Enterprise. The ten archaeological sites and additional isolated features recorded suggest an earlier (12th century) occupation, as well as utilization of the area as a "refuge" site during the Pueblo Revolt, following the primary occupation of Kyaki:ma. The recorded sites are described and the environmental setting, culture history, and previous archaeological research in the area are briefly discussed. The settlement of the survey area is compared with regional patterns of site settlement and type, with particular attention given to the historic village and "refuge period" sites. (45)

Dominguez Chavez, Humberto (INAH) LOS PETROGLIFOS DEL CERRO SAN RAFAEL COAHUILA, UN MODELO DE INVESTIGACION. El estudio arqueológico en la Comarca Lagunera se ha centrado en las cuevas mortuorias, al mismo tiempo que la búsqueda hasta hoy infructuosa de yacimientos arqueológicos estratigráficos. Los estudios de Arte Rupestre en la zona son encasos a pesar de la gran cantidad de sitios hasta hoy localizados. Se presenta un modelo de investigación para estas manifestaciones culturales aplicado en particular al sitio de San Rafael Coahuila, que presenta abundancia de petroglifos y podría tratarse de un centro ceremonial para la celebración de los "mitotes" de los indios Irritillas. Se presenta una ficha de catalogación y un diccionario de diseños. (35)

Douglas, Charles L. (Nevada-Las Vegas) TEMPORAL VARIABILITY IN FAUNAL PROCUREMENT ON BLACK MESA. The results of analyses of faunal remains from sites excavated during the past 10 years on Black Mesa are summarized. Temporal variability in prehistoric faunal procurement are described and hypotheses are presented to explain this variability. (22)

Douglas, John G. (BLM Arizona State Office) THE ACADEMICIAN'S IDEAL AND THE BUREAUCRAT'S PRACTICAL: WHO WINS WHEN LEGAL COMPLIANCE, BUDGET, AND TIME ARE CONTROLLING? However disturbing the prospect, land managing agencies frequently must move forward with fewer of the technical and logistic tools than desired in meeting sample inventory needs, needs imposed for purposes other than "research." A principal challenge is to satisfy both professional and management obligations simultaneously, in the absence of agreed-upon standards and against strict dollar, manpower, and time limits. This paper reviews requirements and conditions under which Arizona BLM has undertaken inventory on some 5 million acres since mid-1976, and invites the academic side of the profession to accept that not all meaningful archaeology need follow the pure-research paradigm. (48)

Douthit, Mary Lee (Southwest Missouri) USE OF SPSS FACTOR IN LITHIC ANALYSIS. Analysis of SPSS FACTOR of lithic artifacts, including waste flakes, from a series of sites in the North Concho valley, Texas, demonstrates significant intra- and inter-site uniformity in manufacturing attributes and, through this, uniformity in methods of exploitation of the local lithic resource, chert. This degree of uniformity, not evident from traditional typological or technological analysis, relates to the more general history of resource utilization in the area. (19)

Doyel, David E. (Arizona State Museum) HOHOKAM SOCIAL ORGANIZATION AND THE SEDENTARY TO CLASSIC TRANSITION. Numerous alternative reconstructions exist regarding the nature of Hohokam social organization. Several postulate little change in the complexity of Hohokam social organization. Others are unidirectional models of developing complexity from simple tribal structures in the pre-Classic period to chiefdom or state structures during the Classic period. An analysis of Hohokam culture, focused on geographic distribution, settlement complexity, regional integration and exchange, suggests that significant differences do exist in the social organization of the two periods, but that they do not necessarily reflect traditional reconstructions. (1)

Drager, Dwight L. (NPS) AUTOMATED DATA PROCESSING OF DIGITAL AERIAL IMAGERY IN CULTURAL RESOURCES SURVEY. The advent of large area cultural resource surveys has demonstrated the impracticality of ground-based techniques for mapping environmental variables in preparation for archaeological survey of sample units. This paper will discuss photographic densitometry as it applies to image digitization and multi-spectral data. The factors that affect photo densities will be pointed out, as well as methods for acquiring data. Once obtained,

digital data can be processed to aid cultural resource managers with such things as the preparation of sampling procedures, environmental maps, site location, site mapping, and other aspects, all of which will be discussed. (24)

Drollinger, LaMar (Archaeological-Environmental Research Corporation) HISTORIC RESEARCH AND THE CULTURAL RESOURCE SURVEY. The paper, in three primary parts, will concentrate on the role that historical research can play in large-scale cultural resource surveys. The first segment will be devoted to the methods employed and problems encountered in the data recording and organization aspects of cultural resource records work. Areas of cooperation and conflict between the disciplines of archaeology and history, as they arise during the conduct of cultural resource inventories, will then be investigated. The final section of the paper will summarize problem areas and present suggestions for closer integration of the fields of archaeology and history on future cultural resource survey projects. (20)

Duncan, Jack W. (Florida Department of Criminal Law Enforcement) SEARCH TECHNIQUES: BURIED BODIES. The search for and recovery of buried bodies is the responsibility of law enforcement officials. Search techniques utilized to locate a suspected grave must be implemented with the same care and precision as those techniques used in any crime scene search. Since no two crime scenes are alike, search techniques must be modified from time to time to allow maximum effect in locating a suspected grave. Collection and preservation of physical evidence must be incorporated into techniques used for locating possible burial sites. This paper will address search techniques used in locating buried bodies and emphasize the importance of proper physical evidence collection procedures. (31)

Durand, Stephen R. (see Baker, L. L.) (6)

Dutton, Bertha P. (New Mexico) AN OVERVIEW OF THE GALISTEO ARCHAEOLOGY. At the 50th anniversary of the Pecos Conference, at Pecos Pueblo ruin, a session was devoted to "The Rio Grande Perspectives from its Periphery." Afterward, one who had attended the original conference remarked: "I thought the Rio Grande was a 'squeezed lemon.' That session told me it wasn't so!" One small area, the Galisteo Basin south of Santa Fe, has come to be viewed as an exponent of Rio Grande Anasazi culture. Although perhaps true in part, other important factors must be considered. This paper will set forth evidence of non-Anasazi features of the Galisteo culture area, with a view to better establishing its place in archaeological history. (37)

Earle, Timothy K. (UCLA) A MODEL OF SUBSISTENCE CHANGE. This paper presents a preliminary model to explain how subsistence producers choose among the procurement strategies available to them and how this selection process can result in changes to their subsistence economies. The model is derived from microeconomics and emphasizes the importance of marginal cost and the variable product of labor in decision making. The model is meant as a coherent, although certainly incomplete, explanation of prehistoric economic change. Its relevance for understanding such important processes as the broad spectrum revolution and the shift to agriculture is discussed. (36)

Earle, Timothy K. (see D'Altroy, T. N.) (23)

Ebert, James I. (NPS) REMOTE SENSING AND LARGE-SCALE CULTURAL RESOURCES MANAGEMENT. Recent trends in cultural resources management, including increasingly large areas to be surveyed and ever-greater concern with reducing the destruction of cultural resources by archaeologists as well as the public, require that new methods of planning, assessment, monitoring, and research be devised and applied nationwide. One domain of such methods is remote sensing, which can increase efficiency, speed and data extraction at all stages of archaeological research. Remote sensing methods which will revolutionize cultural resources management in the near future will be discussed in the context of the National Park Service assessment of 23,000,000-acre NPRA, North Slope, Alaska. (24)

Eckles, David G. (SIU-Carbondale) EXPLANATION OF INTERSITE VARIABILITY IN FAUNAL REMAINS FROM SITES ON BLACK MESA. At present, there appears to have been a change through time prehistorically on Black Mesa in animal exploitation in the form of increasing numbers of smaller animals and decreasing numbers of large game animals, and a change in settlement pattern toward increasing use of upland areas. An attempt is made to test the hypothesis that the variability in the frequency of faunal remains is not related to temporal changes in settlement pattern. (22)

Eddy, Frank W. (see Huse, H.) (45)

Effland, Richard W., Jr. (Arizona State) A SPATIAL ANALYSIS OF KAYENTA ANASAZI OCCUPATION OF THE INNER GRAND CANYON. Kayenta Anasazi occupation of the inner Grand

Canyon will be analyzed from a spatial perspective. Concepts related to spatial and population processes will be used to describe the spatial pattern of sites within the canyon. Comparisons with other Kayenta Anasazi areas will be made on the basis of pattern, spacing, dispersion, agglomeration, and other characteristics. An effort to identify patterns of spatial behavior for Kayenta Anasazi populations will be made. (38)

Eighmy, Jeffrey (Colorado State) RECENT ARCHAEMAGNETIC RESULTS FROM THE SOUTHWEST. Based on preliminary analysis of 28 archaeomagnetic samples collected in Arizona and New Mexico, questions concerning the Southwest archaeomagnetic curve have arisen. Although we were able to reproduce the high level of collection accuracy (i.e., alpha 95s 3°), dating was still ambiguous. Often good samples did not plot near the curve, and in others the position did not agree well with archaeological context information about expected dates. Solving these problems requires more detailed information about how the original curve was constructed, calibrated, and interpreted. (6)

Ellis, Gary (see Grange, Roger T.) (7)

Eiston, Robert (Nevada-Reno) MEDITHERMAL CLIMATIC VARIATION AND CULTURE CHANGE ON THE EASTERN SIERRA FRONT. Recent studies provide support for the hypothesis that the Martis and Kings Beach complexes represent different adaptations to climatic variation. Neoglacial conditions in Martis times (4,000-2,000 B.P.) resulted in a relatively high regional carrying capacity that allowed social organization at the band level, craft specialization, nucleated winter village sites, regular use of favored base camp sites, and a territorially oriented subsistence strategy. Since about 2,000 B.P. the regional carrying capacity has been relatively low, requiring means of adaptation such as recorded for the Washo: a non-territorial, dispersed subsistence strategy, a nonnucleated settlement pattern, and a level of social organization between the family and the composite band. (5)

Emslie, Steven D. (Prescott Center) AN ETHNOBIOLOGICAL STUDY OF THE AVIFAUNA OF POTTERY MOUND. Pottery Mound is a large Pueblo IV ruin located in the Puerco River Valley southwest of Albuquerque, New Mexico. A large number of bird bones recovered during the excavations of this site by the University of New Mexico were submitted to Dr. Lyndon L. Hargrave for analysis. Identification of this bone was not possible until a research grant was received from the Max C. Fleischmann Foundation, through the Prescott Center, allowing Dr. Hargrave to hire a research assistant. Results of this analysis and relations of the birds identified with the numerous preserved kiva murals at the site provide some interesting correlations on the use of birds by the prehistoric Indians. (47)

Ericson, Jonathon E. (Los Angeles County Museum of Art) DIACHRONIC CHANGE OF THREE EXCHANGE SYSTEMS AS VIEWED THROUGH OBSIDIAN PRODUCTION. These interrelated exchange systems are viewed through changes in the rate of obsidian production. Surface sampling, computer graphics, and lithic analysis were used to describe quarry production sites. Recent advances in obsidian hydration dating provided the means to determine the rate of production at these sites. Although quarry production analysis does provide an important technique for studying aspects of regional exchange, there are still many problems that need to be resolved. (33)

Euler, Robert C. (see Effland, R. W., Jr.) (38)

Evans, David R. (Missouri-Columbia) LOCATING SITES IN EAST-CENTRAL MISSOURI: PROBLEMS AND SOLUTIONS. The Meramec Archaeological Project has recently completed a program of evaluating various site-locating techniques. These techniques include: traditional pedestrian survey, transect plowing, shovel testing, and magnetometric and phosphorus survey. The efficacy of those techniques ranged from highly useful to useless, with some of the more current and popular techniques at the lower end of the scale. Comparisons are drawn *vis à vis* various kinds of costs and the applicability of specific techniques to specific terrain conditions. Recommendations are made as to the utility of the various techniques and the necessity of additional comparative programs. (13)

Evans, Susan T. (Pennsylvania State) A STRUCTURAL ANALYSIS OF CENTRAL PLACE DEVELOPMENT IN THE VALLEY OF MEXICO. The evolution of central place systems in the Valley of Mexico is analyzed from a diachronic perspective, from the Early Horizon to the Spanish conquest. The method used is the recently developed explanatory framework of Q-analysis, a "language of structure" written in algebraic topology, specifying binary relations between sets of variables. The structures describing these relations can be interpreted as a set of polyhedra, whose vertices correspond to the settlements themselves, or to variables under study. Comparison of different structures, representing states of the Valley of Mexico settlement system over time, allows determination of the forces producing structural change. (40)

Fankhauser, B. (see Tuggle, H. D.) (14)

Feder, Kenneth (see Del Bene, Terry) (19)

Fehr, R. T. (see Sutro, L. S.) (38)

Feinman, Gary (CUNY) THE EFFECTS OF A CHANGING ADMINISTRATIVE ORGANIZATION ON CERAMIC PRODUCTION WITHIN THE PREHISPANIC VALLEY OF OAXACA. A diachronic model for explanation of changing strategies of ceramic production within the prehispanic Valley of Oaxaca is outlined. A series of hypotheses is then proposed in order to support or refute this model. Methods of locational analysis are used to test those hypotheses concerned with diachronic shifts in regional settlement pattern while simple statistical techniques are utilized to test the hypotheses concerned with spatial and temporal variability within the ceramic data set. A diachronic relationship between administrative organization and ceramic production is shown to exist and several interpretive implications of this relationship outside the Valley of Oaxaca are suggested. (29)

Feldman, Lawrence H. (Missouri-Columbia) SNAILS, CLAMS AND MAYAS: THE USE OF MOLLUSKS TO MEASURE ECOLOGICAL CHANGE. Changes in agricultural practices may be determined from percentages of different molluscan remains found in archaeological phases. In Belize, a uniquely long sequence allows one to trace these changes from the Early Preclassic into the Postclassic, a sequence more than 3,000 years long. Comments are made on swiddening, tree crops, intensive land utilization and the Corozal sample is compared with data from the Peten and elsewhere in the Mayan area. (10)

Ferguson, T. J. (Zuni Archaeological Enterprise) THE GROWTH OF ZUNI PUEBLO. The growth of Zuni Pueblo is discussed in terms of architecture, village layout, and the formation processes of the archaeological record. A short architectural history of the pueblo is presented. Formation processes identified during recent archaeological monitoring of the construction of a new water system in the pueblo are discussed. (45)

Ferguson, T. J. (see Dodge, W. A.) (45)

Ferguson, T. J. (see Mills, B. J.) (45)

Fernandez, R. (see Winter, M.) (49)

Fesperman, Pamela R. (Florida State) NON-HUMAN BONE ALTERATION AND SCATTER PATTERNS. During criminal investigations it is often necessary to determine whether the position of human skeletal remains is the result of a criminal act or natural cause. Moreover, bone damage, when observed, also needs to be determined as being naturally or criminally inflicted. Experimentation to clarify these problems was conducted using domestic and wild animals familiar to the northwest Florida area. The results of this study indicate that different animal species alter bones and scatter them in unique ways. (31)

Fesperman, Pamela R. (see Karwesky, R. A.) (46)

Findlow, Frank J. (Columbia) PREHISTORIC OBSIDIAN USE IN SOUTHWESTERN NEW MEXICO. Local and regional aspects of prehistoric obsidian procurement are analyzed using Animas phase data from southwestern New Mexico. The initial results of this study suggest that a dual system involving both direct and indirect procurement was in use throughout the area. The implications of such a dual system for the understanding of lithic raw materials use throughout southwestern New Mexico are discussed. (33)

Finsten, Laura (Calgary) THE CLASSIC-POSTCLASSIC TRANSITION IN THE VALLEY OF OAXACA, MEXICO. Settlement pattern shifts following the abandonment of the Main Plaza at Monte Albán suggest that the highly centralized primate system of the Late Classic collapsed and was replaced by a more decentralized mode of regional organization. The nature of this Early Postclassic settlement system is elucidated by the analysis of the distribution and internal organization of the major centers. (29)

Fisch, Eva (CUNY) DISCONTINUOUS SITE SIZE HIERARCHIES IN FORMATIVE MESOAMERICA. Discontinuous site size hierarchies are the rule in most known Formative Mesoamerican societies. One site can represent as much as three-fourths of the population of any one region. This paper presents a model derived from locational theory to account for the existence of discontinuous, two level settlement hierarchies with impressively large sites in the Early and Middle Formative. The model is evaluated with data from the Valley of Oaxaca, Mexico. (29)

Fish, Paul (Georgia) BEYOND TOOLS: DEBITAGE ANALYSIS AND CULTURAL INFERENCE IN THE MIDDLE PALEOLITHIC. Debitage has received cursory treatment in most Paleolithic artifact analyses and interpretations related to debitage usually have been restricted to the narrowest technological levels. In order to document the potential of debitage analysis for various types of cultural inference, data from several Middle Paleolithic sites (Qafzeh, Tabun, Combe Grenal, Pech de l'Aze, and Corbiac) are cited. For example, selective processes in tool use and manufacture in single sites are inferred from the kinds and distributions of debitage. Debitage is also utilized to provide insight into a range of questions of archaeological interest such as activity location and chronology. (34)

Fish, Paul R. (see Pilley, Peter) (8)

Fish, Suzanne K. (Georgia) PALYNOLGY OF EDZNA AND AQUACATAL: ENVIRONMENT AND ECONOMY. A series of pollen samples from archaeological contexts at the site of Edzna, Campeche are used to interpret prehistoric environmental conditions and cultural practices. Interpretations are made in the light of an examination of modern surface spectra from the environs of the site. The series from Edzna will be compared with a smaller series from Aquacatal. (10)

Flataker, Catherine S. (Chicago) MOUSTERIAN FACIES IN ENGLAND AND IN MEDITERRANEAN SPAIN. This paper deals with a re-examination of the "Bordesian" Mousterian facies in the light of major differences found between collections in England and in Mediterranean Spain. Only the Mousterian of Acheulean Tradition and Quina facies are represented in England, whereas only Denticulate and sidescraper-enriched Typical facies have been found in eastern and southern Spain. Environmental, stylistic, and other information are discussed in an effort to explain the major differences in "facies" representation between these two areas. (34)

Ford, Richard I. (Michigan) THE SIGNIFICANCE OF ARCHAEOLOGICAL PLANT REMAINS FOR INTERPRETING PREHISTORIC ADAPTATIONS ON BLACK MESA. More than 6,000 flotation samples from archaeological sites on Black Mesa have been analyzed. The results support the basic proposition that corn agriculture and the resulting plant community transformations associated with its technology increased the useful plant biomass of the prehistoric inhabitants. Concomitantly, an increased population and reduction in alternative resources resulted in a fragile ecosystem that was progressively degraded. Plant evidence includes charcoal, cultigens, and seeds from a variety of indigenous plants. (22)

Fowler, Melvin L. (Wisconsin-Milwaukee) PRE-HISPANIC LITHIC INDUSTRIES IN THE PUEBLA VALLEY. A variety of lithic materials have been recovered by the Puebla Preclassic Project (1975-77) from intensive controlled surface survey and from test excavations. The items recovered through this research will be described and analyzed in this report in terms of the following areas: (1) the type and range of variation of the raw material from which the artifacts were manufactured, (2) the tool types that these specimens represent, (3) the identification of the source of raw materials, and (4) the kind of technology that each represents. (40)

Francis, Julie E. (Arizona State) THE EFFECT OF CASUAL COLLECTION OF BEHAVIORAL INTERPRETATIONS OF ARCHAEOLOGICAL DATA. The amount and quality of information that can be gained through the systematic collection of surface remains is of great concern to archaeologists undertaking regional surface surveys. Under ideal conditions, the kinds and dispersal of materials found on the surface of the site will reflect not only the behavior of the prehistoric occupants, but the site's erosional and depositional history, as well as human action subsequent to the original deposition of the site such as casual removal of materials from site surfaces. This paper presents a method for the evaluation of casual surface collection from site surfaces of 23 sites recorded during the 1976 survey of the Little Colorado Planning Unit. (6)

Freeman, L. G. (Chicago) THE GARBAGE SHALL RISE AGAIN: STONES, BONES, CHARCOAL AND SEEDS FROM MOUSTERIAN LEVELS AT ABRIC AGUT (BARCELONA, SPAIN). During 1976, excavations at the small shelter called Abric Agut near Capellades, undertaken as part of a regional research project jointly directed by Freeman, E. Ripoll, and H. de Lumley, revealed several intact levels containing Mousterian artifact assemblages, all apparently assignable to a regional variant of the Denticulate facies. By means of simple water flotation, charcoal from several deciduous and coniferous tree species was recovered from these levels. One occupation yielded carbonized seeds, which we believe are food remains. This is, as far as we know, the first time vegetal food remains have been recovered by flotation from Mousterian deposits in Europe. (34)

Freimuth, Glen (Illinois) X-RAY FLUORESCENCE ANALYSIS OF CERTAIN MIDWEST CHERTS. In cooperation with the Illinois State Geological Survey, the analysis of known and suspected prehistoric quarries in and near Illinois has been initiated to provide both identification methods

and usable data. The results of x-ray fluorescence analysis are presented as a feasible means of chert source identification. (43)

Friedman, Janet (USDA Forest Service) PREHISTORY IN HELLS CANYON NATIONAL RECREATION AREA. Designation of Hells Canyon as a National Recreation Area has intensified interest in the prehistory of the extremely rugged, effectively inaccessible canyon bordering Idaho and Oregon. Through legislation, there is financial support available or forthcoming for conducting significant research in the prehistory of Hells Canyon. Limited previous research in Hells Canyon has emphasized cultural relationships with the Plateau, belying significant Great Basin influences. This paper reviews aspects of Hells Canyon NRA legislation relevant to research in prehistory, significant archaeological literature regarding Hells Canyon, and evidences for Great Basin and Plateau influences as the bases for working hypotheses for scheduled research. (11)

Frisbie, Theodore R. (SIU-Edwardsville) SOCIAL RANKING IN CHACO CANYON, NEW MEXICO: A MESOAMERICAN-DERIVED RECONSTRUCTION. Models for social ranking, i.e., chiefdom-like organization, have been presented in print by several individuals to account for what has been aptly termed "the Chacoan phenomenon"; however, the models do not take account of Mesoamerican derived features that are readily apparent in the area. The present paper utilizes both internal and external causative factors with the latter acting as catalyst on the former. The sequencing and patterning of cultural events offered by this interpretation appear to be congruent with the archaeological data currently available. (37)

Fry, Robert E. (Purdue) MODELS OF EXCHANGE FOR FUNCTIONAL CLASSES OF LOWLAND MAYA POTTERY. Several recent studies have shown that there are distinct distribution patterns for major functional classes of pottery during the Classic period. This paper will propose alternative models for pottery distribution at Lowland Maya sites, relating these to the overall economic structure of lowland sites. Evidence in support of one of the models from research at Tikal, Guatemala, and central Quintana Roo, Mexico will be presented. Implications of an approach to ceramic variability using both stylistic and technological attributes for traditional Type-Variety classification will be examined. (21)

Fryman, Jeanne W. (Museum of Northern Arizona) ANALYSIS OF THE INVENTORY DATA FOR THE BLACK-CERBAT ENVIRONMENTAL STATEMENT AREA, NORTHWESTERN ARIZONA. The Museum of Northern Arizona, as contractor, analyzed BLM's Black-Cerbat survey data and prepared the cultural resource portions of the ES. Computer-aided analyses of the data were used to generate management information relevant to identifying areas of critical concern for cultural resources, evaluating probable impacts from the proposed action, and defining appropriate mitigation measures. This paper makes a critical appraisal of the survey's adequacy for estimating cultural resource populations for both general and specific management purposes, and examines the contributions of the survey and the data analysis to overall archaeological knowledge of the project area. (48)

Gallagher, Joseph G. (USDA Forest Service) SCARIFICATION AND CULTURAL RESOURCES: AN EXPERIMENT TO EVALUATE A TIMBER MANAGEMENT TECHNIQUE. National Forests employ a number of resource management techniques, few of which have been evaluated in terms of their impact on cultural resources. Scarification is commonly employed by timber managers to insure healthy timber regrowth on harvested units. The effect of this management practice on cultural resources is reported through the analysis of contextual changes within an artificial site that had been scarified. Management recommendations are offered. (12)

Garrow, Patrick H. (Soil Systems, Inc.) THE NEW AND THE OLD: THE BEDFORD-PINE AND EDENTON ARCHAEOLOGICAL INVESTIGATIONS. This paper discusses the approach to and results achieved from archaeological investigations of two urban tracts. Each tract occupied the same relative geographical position within its respective city, and each city has grown largely as a result of its strategic location within a regional transportation/communication network. The methodology utilized to explore these tracts and the major results are discussed. Problems faced during these investigations are also discussed, and an approach is delineated that should be applicable to many types of urban archaeological investigations. (7)

Gasser, Robert E. (Arizona State) EXCHANGE IN HOHOKAM SUBSISTENCE PRACTICES. Did the Hohokam engage in exchange of subsistence items? A comprehensive survey of intersite variability in archaeobotanical food remains from Hohokam sites is examined with relation to variability in the distribution of natural resources. Differences that cannot be explained using strictly ecological parameters might indicate trade in subsistence items. Exchange models developed from Pima and Papago ethnographies act as an aid in explaining the Hohokam archaeobotanical data. (1)

Gaxiola, M. (see Winter, M.) (49)

Gero, Joan M. (Massachusetts-Amherst) DATA RETRIEVAL FROM STORED MEMORIES. Collector interviews can maximize the identification and location of sites when used to structure fieldwork in intensively developed or heavily vegetated areas. In New England, the distribution of collections and collector territories is a response to historic land tenure patterns and the attendant concepts of property and ownership. The composition of collections today similarly reflects local processes of trade and redistribution. From an understanding of these biases in collector-provided data, the proposed strategies are recognized as providing predictable and cost-efficient information. (13)

Giorgi, Patricia A. (BLM Phoenix District) A FIELD TEST OF ARCHAEOLOGICAL SENSITIVITY PROJECTIONS IN THE BLACK-CERBAT ES AREA, NORTHWESTERN ARIZONA. Project-specific, intensive field examinations have been performed as part of the feasibility studies for the construction of many of the proposed range improvements in the Black-Cerbat Environmental Statement area. Results of these surveys provide test verification for the analytical techniques utilized in writing the ES. Strengths and weaknesses of sensitivity projections based on statistically derived, environmentally stratified inventory samples are examined, with suggestions for the design of future management-oriented sampling strategies. (48)

Goad, Sharon I. (Georgia) EXCHANGE NETWORKS IN THE SOUTHEASTERN UNITED STATES. This paper discusses the exchange networks extant during the Middle Woodland (200 B.C.-A.D. 400) period of the southeastern United States. A hierarchy of Middle Woodland sites is developed for the southeast using the criteria of site size and artifact distribution. The movement of exotic raw materials throughout the southeast is discussed in relation to these proposed hierarchies. (46)

Gorenstein, Shirley (see Pollard, H. P.) (40)

Gorman, Frederick J. E. (Boston) REFUSE PATTERNING IN AN EIGHTEENTH CENTURY GLASS MANUFACTURING COMMUNITY: IMPLICATIONS FOR URBAN HISTORICAL ARCHAEOLOGY. Most colonial pyrotechnic industries were situated near fuel forests until the late 18th century when transportation improvements permitted their relocation in certain eastern cities. Establishment of urban glasshouses or metal foundries often initiated growth of heavy manufacturing districts, and archaeological surveys of such regions should locate the remains of these factories. Our knowledge of metropolitan glasshouses and foundries rests more upon historical than upon archaeological information. Since this bias is reversed in the study of their earlier rural counterparts, analysis of refuse patterning at the rustic New England Glassworks (1780-82) may aid in the archaeological identification of later urban factories. (7)

Gould, Robin A. (SIU-Carbondale) CERAMIC IMITATION: A SUPPLY-DEMAND INTERPRETATION. "Imitation" ceramics or local varieties as an indigenous response to trade wares have long been recognized in the archaeological record. The process underlying their inculcation into the society in terms of response, assimilation of new ideas, and attempts to copy or imitate has not been addressed by traditional archaeological typologies. Documented examples of imitation will be summarized, and a formal economic solution will be offered to explain ceramic distribution in terms of a supply and demand model. (38)

Grady, Mark A. (SMU) CONSIDERATIONS OF THE TEXAS ARCHAIC INTERACTION SPHERE. Although the information that has been collected for the Archaic adaptation to Central and East Texas is not consistent, it suggests that, from a broad regional perspective, this lifeway changed considerably in terms of economic exchange networks and interaction spheres. More specifically, shifts in lithic raw material usage, artifact manufacture, and assemblage integration suggest that the Archaic adaptation was characterized by a substantial reduction in economic interaction and a concurrent trend toward localized specialization. Some of the implications of these observations are pursued, and suggestions are made for evaluating the accuracy of the resultant premises. (35)

Graham, Martha (North Carolina-Chapel Hill) SKELETAL RECOVERY IN FORENSIC CASES. Proper recovery of skeletal material in forensic cases is crucial. Intervention by lay persons may lead to destruction of the scene, less than full recovery of pertinent materials associated with the remains, and, in some cases, damage to the skeleton itself. Cases are presented to illustrate the above, and discussion follows as to education and working with law enforcement agents in skeletal recovery procedures. (31)

Grange, Roger T. (South Florida) EXCAVATIONS AT YBOR CITY, TAMPA, FLORIDA. Archaeological salvage and research in an ethnic community in Tampa are discussed. The site was

occupied from 1886 until 1976. Problems of ethnic identification, dating by bottle chronology, and culture change will be discussed. (7)

Grayson, Donald K. (Washington) THE GATECLIFF SHELTER MICROVERTEBRATES. Gatecliff Shelter (26NY301) is located in the Toquima Mountains of central Nevada. The rich and deep deposits of the site span at least the last 8,000 years. The site yielded a very large vertebrate fauna, the bulk of which is composed of artiodactyls, especially mountain sheep (*Ovis canadensis*). The sizeable sample of smaller vertebrates—Insectivores, lagomorphs, rodents, and small carnivores—which is also present, forms the focus of this report. Inferences concerning the changing environments of the area surrounding Gatecliff Shelter which may be drawn from the microvertebrates are discussed, as are the implications of this microfauna for understanding the modern and past biogeography of Great Basin mammals. (5)

Grayson, Donald K. (see Mehringer, Peter J., Jr.) (5)

Grebinger, Paul (Eisenhower) DESERT VERSUS RIVER HOHOKAM: A MATERIALIST CRITIQUE AND RESEARCH DESIGN. The cultural materialist paradigm sets clearly defined epistemological limits for archaeological research. In these terms, existing models of the Desert-River Hohokam interface are inadequate. Either they (1) are based on non-materialist assumptions and propositions, or (2) are not systematically ordered in terms of the materialist paradigm. Furthermore, a critical review of published and unpublished data from the Santa Cruz drainage shows that these sources do not lend themselves to the systematic distributional studies from which a materialist model might be constructed. In order to resolve this dilemma a multistage research design to discover key patterns in material culture distributions is outlined. (8)

Green, Margerie (Arizona State) VARIATION IN CHIPPED STONE RAW MATERIAL USE ON BLACK MESA. Results of a survey to locate sources of raw materials used in making chipped stone artifacts for the Black Mesa area of northeastern Arizona are presented. The distribution of the various raw material types for several hundred sites within a 50 square mile survey area is discussed. Variation in the degree of reliance on different sources as indicated by proportions of raw material on sites is viewed over time. Particular emphasis is placed on distance from source and possible differences between habitation sites and limited activity sites. Computer graphics are used to illustrate observed patterns. (22)

Green, Stanton W. (South Carolina) THE STABILITY OF FRONTIER AGRICULTURAL SYSTEMS: SOME ARCHAEOLOGICAL IMPLICATIONS FOR THE SPREAD OF AGRICULTURE IN TEMPERATE HABITATS. Frontier agriculture is presented as a colonization process whereby agriculture is introduced into a habitat. The discussion will focus on both the new set of culture-ecological interactions set off by the colonization process and the implications for long term stability of temperate agricultural systems. The model delineates key cultural and ecological variables and suggests that, in temperate habitats, agricultural colonization tends to select for growing populations, which self-perpetuate the colonization process. The archaeological implications of this model for the spread of agriculture into temperate habitats are then discussed and evaluated against two cases: prehistoric (neolithic) Denmark, and historic (16th century) Finland. (2)

Green, Stanton W. (see Brooks, M.) (13)

Greenwood, Roberta (Los Angeles County Museum) LAND DEVELOPERS INVOLVEMENT IN PUBLIC ARCHAEOLOGY. Environmental laws in California require developers and land modifiers to be concerned with archaeological resources. However, many times this concern is with the letter and not the spirit of the law. This attitude has resulted in the need to educate land developers about what archaeological resource evaluation entails and how archaeology can be mutually beneficial to them and to archaeology. Using the HUD-sponsored San Buenaventura project in Southern California, suggestions are offered about how to educate and involve developers in responsible resource management. (18)

Griffin, P. Bion (Archaeological Research Center Hawaii) TECHNOLOGY AND THE HAWAIIAN ADAPTIVE SYSTEM. A science of technology, placed in a theoretical context of adaptation of populations of *Homo*, may allow insights into explanation of change. Data drawn from Polynesia, especially Hawaii, illustrate the application of technology to understanding the trajectories of adaptation. Constraints on temporally increasing complexity in Hawaii and Tahiti are discussed, and patterns of the interaction of the technological and social systems analyzed. (14)

Gumerman, George J. (Southern Illinois) THE HOHOKAM OF THE NORTHERN PERIPHERY. New data from the region north of Phoenix reinforces the suggestion that the Hohokam maintained an elaborate system of local specialization and trade in subsistence and non-subsistence items. It appears that this internal Hohokam system of local specialization was reinforced by

external economic relationships with the regions north and west of central Arizona. The result of the local economic specialization and of locality specific exchange relationships with non-Hohokam peoples has resulted in a large number of Hohokam "regional variations" in a relatively small area in central Arizona. (8)

Haas, Herbert (see Hassan, Afifa A.) (6)

Hales, Donald (see Hudson, L. B.) (27)

Hally, David J. (Georgia) ACTIVITY ANALYSIS OF THREE STRUCTURES FROM A PROTOHISTORIC SITE IN NORTHWEST GEORGIA. Cultural material recovered by flotation from three structures at the protohistoric Little Egypt site in northwest Georgia has been analyzed for distributional and associational patterns. Several activities—including food preparation, chert knapping, storage, and sleeping—can be recognized and localized within each structure and indicate a general domestic function for all three structures. (46)

Hamblin, Nancy L. (Arizona) ISLA COZUMEL ARCHAEOLOGICAL AVIFAUNA. This paper represents the summary and analysis of several hundred bird bones (comprising approximately 25 different species), excavated from six prehistoric Maya sites on the island of Cozumel, Mexico, in 1972-73 by the Cozumel Archaeological Project. Discussion will focus on the differential utilization of various ecological zones, a comparison of avifaunal exploitation by the different sites, the use of certain bird species for ceremonial/religious purposes, the role of specific birds in the Cozumel trade network, and the relative significance of the various birds in the diet of the Cozumel Maya. (3)

Hamblin, Robert L. (Arizona) ELITE DEVELOPMENT AND PEASANT REBELLION: MODELING CLASSIC MAYA DATA. This paper employs mathematical models of social conflict, collective learning, and social development to study the sociocultural growth and decline of the Classic Maya. The data are the through-time occupancy of Maya ceremonial centers by peoples producing elite monuments with long-count dates. A comprehensive theory is presented which posits that the patterns of change resulted from the cumulative, through-time dialectic effects of developing social technology and escalating conflict, eventuating in peasant rebellions. The archaeological evidence for various alternative theories is then evaluated. This analysis shows that the dialectic models can account for both the eras of growth and decline. (27)

Hammatt, Hallett H. (Archaeological Research Center Hawaii) GEOARCHAEOLOGICAL STRATIGRAPHY IN THE HAWAIIAN ISLANDS: SOME PROPOSITIONS AND PRELIMINARY RESULTS. The relatively short time span of human occupation (approximately 1,300 years), extreme microenvironmental contrasts, and rapid pedogenic alteration of deposits would appear to limit the application of inter-site stratigraphic research related to archaeological problems in the Hawaiian Islands. However, investigations on the islands of Kaho'olawe and Kauai show that there are recognizable local and regional stratigraphic sequences. On Kaho'olawe two major depositional units are separated by one soil stratigraphic unit and a widespread charcoal layer. There is evidence that island-wide burning may have been the initial cause of cumulative denudation which dramatically altered habitats and led to depopulation of the island. (14)

Hampson, Steven E. (Irvine) CLOSED MODELS OF OPEN SYSTEMS. Cultural systems are open systems: they lack clear divisions from one another, from noncultural systems, and from their own later phases. An indefinite number of variables interact in open systems; however, all explicit systems models are closed since they must specify a definite number of variables. Two consequences of this observation will be motivated and explored: (1) closed models of open systems are most adequate when focused on system boundaries; (2) the possible descriptions and strategies for explanation of cultural stability differ from those for cultural change. (2)

Hanson, Christine (Arizona State) POPULATION STRUCTURE AND COMPOSITION ON BLACK MESA, ARIZONA. Change in the archaeological record is often attributed to population changes. Analysis of human skeletal material recovered by the Black Mesa Archaeological Project offers an opportunity to explore population structure and composition. Basic demographic data are presented and a population model proposed. The implications of this model are discussed. Osteological evidence of paleoepidemiology and paleopathology are investigated in relation to changing social patterns and nutritional habits. The possibility of biological affinities with other prehistoric groups is also examined. (22)

Hanson, Glen (South Carolina) THE RUSSELL ARCHAEOLOGICAL PROJECT: A SURVEY OF FORESTED LANDS IN THE SOUTH APPALACHIAN PIEDMONT. The Russell Archaeological Project involved the survey of heavily vegetated area. The application of strictly probabilistic sampling designs became a central concern because of their inability to identify sites in locations known to contain them. This paper discusses the results of the project and offers

suggestions for future research with regard to: (1) *a priori* examination of historic land use patterns as they affect the archaeological record, (2) modern land use as it affects survey design, (3) erosion as it pertains to site preservation, and (4) vegetation as a barrier to ground level inspection. The emphasis is upon the relative effectiveness of sampling designs with respect to archaeological distributions and the careful use of judgment. (13)

Hantman, Jeff (Arizona State) PREDICTING OCCUPATION DATES OF PREHISTORIC BLACK MESA SITES: A COMPARISON OF METHODS. Using ceramic design attribute frequencies and ceramic type frequencies from a set of tree-ring dated sites on northern Black Mesa, several methods of temporally ordering sites are compared in terms of their predictive accuracy. In addition, discussions are presented of rates of design change through time in northeastern Arizona and of the value of traditional polythetic ceramic types in estimating site dates. (22)

Hardesty, Donald L. (Nevada-Reno) HISTORICAL ARCHAEOLOGY IN THE GREAT BASIN: RETROSPECT AND PROSPECT. The development of historic sites archaeology in the Great Basin is examined from the perspective of theory and method. Several current problem areas are discussed, including the impact of recent federal legislation, the "anthropological transformation" and its effect upon research strategies, the study of ethnic relationships, frontier adaptations, and training programs. The use of historic sites archaeology in "applied" programs, such as the UNESCO MAB (Man and the Biosphere), is discussed as a possible future direction. (5)

Harrill, Bruce (see Breternitz, C. D.) (30)

Harrold, Francis B., Jr. (Chicago) A COMPARATIVE STUDY OF EURASIAN PALEOLITHIC BURIALS. Although they are a rich source of information on the sociocultural aspects of Paleolithic adaptive systems, burials have seldom been the object of systematic study. Untestable attempts to interpret the mortuary symbolism of extinct cultures have less potential value than documentation of the types and degree of variability in Paleolithic burials, which reflect indirectly the sorts of social distinctions recognized by the societies of the deceased. Quantitative analysis of data available in the literature indicates, among other findings, that there are significant differences in mortuary variables (and, by implication, in certain sociocultural variables) between Middle Paleolithic and Upper Paleolithic burials. (34)

Hartman, Dana (Museum of Northern Arizona) ARCHAIC ADAPTATIONS IN EAST CENTRAL ARIZONA. During the 14 month period of September, 1976, to November, 1977, the Museum of Northern Arizona mitigated 48 impacted sites along the Coronado Transmission Line in east central Arizona. Several of these sites are Archaic food processing/camp sites with artifact assemblages characteristic of the Desert Culture. The transmission line traverses a number of distinctive micro-environmental zones and, without exception, all of the mitigated Archaic camps are associated with a specific environmental situation. The location of the Archaic camps in areas of optimal environmental conditions often resulted in their re-occupation during Basketmaker/Pueblo times. (42)

Hassan, Afifa A. (Washington State) EVALUATION OF BONE FOR RADIOCARBON DATING. Radiocarbon dates of bone collagen andapatite from several archaeological sites are compared with other dates. The pure collagen yielded ages in the expected ranges. Amino acid analysis served as a means to check the purity of the separated collagen and the reliability of the techniques employed. Carbon isotope studies on modern and fossil bones and the associated sedimentary carbonate indicate post-mortem exchange of carbon in boneapatite. X-ray diffraction and infrared studies indicate post-mortem recrystallization of the bone mineral. Theapatite dates, in some cases, could be improved using the fractional hydrolysis technique. Our results so far indicate that collagen andapatite bone dating can be significantly improved by adequate sample pretreatment. (6)

Hastorf, Christine A. (UCLA) CHANGING RESOURCE USE IN SUBSISTENCE AGRICULTURAL GROUPS: PREDICTIONS FROM AN ECONOMIC MODEL. A model based on cost-benefit analysis is used to produce predictions about resource mixes in subsistence economies. Environmental information for three distinct time periods at one location in the Mimbres River Valley, New Mexico, is organized within the framework of a site-catchment analysis. The results of the site-catchment analysis are graphically depicted in the model as a series of potential yields for various resource strategies in each time period. The predictions concerning resource use are derived when prehistoric population size is considered with reference to the potential yields. These predictions are then tested against the archaeological data. (36)

Hay, Conran A. (Pennsylvania State) THE STRUCTURE OF OBSIDIAN PRODUCTION AT EARLY CLASSIC KAMINALJUYU, GUATEMALA. A technological analysis of the obsidian assemblage from Early Classic Kaminaljuyu, Guatemala indicates that obsidian production was internally

differentiated and specialized. The components of this industry are identified, and its structure is reconstructed. At Kaminaljuyu, obsidian production, distribution, and consumption were intimately related to more general economic relationships, such as chiefly redistribution and market exchange. An analysis of this industry thus provides information concerning the economic structure of Kaminaljuyu. Furthermore, it suggests that the obsidian industry had important influences on the development of Kaminaljuyu society. (27)

Haynes, C. Vance (Arizona) GEOCHRONOLOGY OF THE LOWER POMME DE TERRE RIVER. The Lower Pomme de Terre River includes the important archaeological and paleontological sites of Rodgers Shelter, and Phillips, Koch, Boney Springs, Trolinger and Jones Springs, all of which occur in alluvium of three terraces (T-0, T-1, and T-2). Koch and Boney Springs alluvium, dating from 13,000 to more than 50,000 B.P., contains Rancholabrean faunas and no evidence of early man. Archaeological evidence is confined to the Holocene deposits represented by Rodgers alluvium (T-1b), ca. 11,000 to 1,400 B.P., and Pippins alluvium (T-0), ca. 1,000 B.P. to the present. A major erosional episode occurs at ca. 8,000 B.P.; an erosional hiatus of 1,000 years occurs between 6,300 and 5,200 B.P.; and another of ca. 500 years occurs at ca. 1,100 B.P. Other breaks in the radiocarbon chronology are not definitely related to erosional contacts. (26)

Haynes, C. Vance, Jr. (see Hassan, Afifa A.) (6)

Hays, T. R. (see Morenon, E. P.) (45)

Healy, Paul F. (Trent) THE PALEOECOLOGY OF THE SELIN FARM SITE (H-CN-5), DEPARTMENT OF COLÓN, HONDURAS. Zooarchaeological analysis of a sizeable, well-preserved collection of faunal and molluscan remains excavated from site H-CN-5 in 1976 provides the first detailed information on the paleoecology of a Selin Period settlement in northeast Honduras. The Selin site, located just north of Trujillo, and south of the Guaimoreto Lagoon, in the Department of Colón, reveals a prehistoric subsistence pattern that heavily exploited the rich local marine resources, the lagoon estuary zone, and the forest fauna of the Aguán River Valley and Honduran interior. The report outlines the diversity of faunal and molluscan species recovered and the respective changes in their representation through the seven century span of the Selin Period (ca. 300-1,000 A.D.). (32)

Heisler, David M. (Southern Mississippi) ROMAN INFLUENCE OF THE PEOPLES OF SCOTLAND. Lowland Scotland was at times part of the Roman Empire; Highland Scotland was not. Archaeological evidence indicates that life in the North was unaffected, except for the possible migrations of peoples from southern England, forced north by Roman pressure. In the Lowlands, romanization of native centers can be seen, but rural life remained largely unchanged. This situation can be credited to the transient military nature of the Roman experience in Scotland. (23)

Hernandez, G. (see Winter, M.) (49)

Hesse, Brian (see Wapnish, P.) (23)

Hester, James J. (see Huse, H.) (45)

Hester, James J. (see Walker, D.) (12)

Hester, Thomas R. (Texas-San Antonio) QUARRY SITES AND THE LITHIC PRODUCTION SYSTEMS OF SOUTH AND SOUTH CENTRAL TEXAS. Chert quarries and quarry workshops in south central and southern Texas have been largely ignored by archaeologists. However, they constitute an important segment of the aboriginal settlement systems, and the analysis of these sites has added greatly to our understanding of the prehistoric lifeways in these regions. In the past several years, the author and colleagues at the UTSA Center for Archaeological Research have conducted systematic studies of several quarry workshops. The role of these sites in the settlement and lithic production systems is examined in this paper. Two distinctly different quarry workshop systems are noted for the two regions, reflecting divergent lithic resources and differing modes of resource exploitation. (33)

Hobgood, John (Chicago State) AZTEC AZTLÁN AND THE GREATER SOUTHWEST. The first recorded interest in rediscovery of Aztlán, traditional northern homeland of the Aztecs, is given by Diego Durán in his account of the expedition sent by Moctezuma I (ruled 1440-1468) in search of Chicomostoc. Another early post-Conquest account is given by Indians living near Casas Grandes, identifying this great site as the "Casa de Moctezuma." In later times the myth of Aztlán spread as far as the Moskogee Indians. These and other examples demonstrate the powerful and dynamic influence of the Mesoamerican Great Tradition well into the Colonial period in the Greater Southwest. (37)

Holley, George R. (see Gould, R. A.) (38)

Holloway, Richard G. (Texas A & M) ORGANIC RESIDUE ANALYSIS OF PREHISTORIC LITHIC ARTIFACTS: AN EXAMPLE FROM HINDS CAVE, TEXAS. Many lithic artifacts recovered from Hinds Cave, Texas, revealed the presence of organic residue presumably associated with use. A small sample of this residue was removed from each artifact and a large quantity of organic debris was revealed, much of which was identifiable, some to the species level. Chemical tests were conducted which indicated the presence of such plant remains as lignin and starch. The use of this data, in conjunction with detailed edge wear analysis, yielded information concerning both the duration of tool use and identification of the actual plants that were being processed with these tools. (28)

Hommon, Robert J. (Hawaii State Historic Preservation Office) INLAND EXPANSION AND THE FORMATION OF HAWAIIAN INCIPIENT STATES: A.D. 1400-1650. Data collected during the ongoing archaeological survey of Kaho'olawe Island, including basaltic glass hydration-rind age-determinations for most sites and features, allow testing of important aspects of a model of incipient state formation in pre-contact Hawaii. The archaeological data of Kaho'olawe, supported by fragmentary evidence from other Hawaiian islands, indicate a major inland expansion of settlement and land use beginning ca. A.D. 1400. It is suggested that this group-wide inland expansion had profound demographic, environmental and socioeconomic consequences that may be directly related to the formation of Incipient states by the mid-17th century. (14)

Hopkins, Nicholas A. (Autonoma Metropolitana-Iztapalapa) OTOMANGUEAN LINGUISTIC PRE-HISTORY. The development of Otomanguean, a major linguistic family of Mesoamerica, is traced from the beginnings of its diversification in the Archaic. Recent linguistic research includes the first systematic reconstruction of Proto-Otomanguean phonology and lexicon, and the first treatment of the languages in terms of innovations shared across the developing subgroups. Ethnobotanical vocabulary of Proto-Otomanguean has been correlated with plant remains from Tehuacan, part of the proposed homeland of Otomanguean. Phonological developments reflect the formation of regional subgroupings which correlate with archaeological material. Loan words indicate contacts with Mixe-Zoque (Olmec). A homeland for Chiapanec-Manguean is proposed. (49)

Howard, James D. (see DePratter, C. B.) (46)

Hoyt, Margaret A. (New Mexico State) CHIMU STATUS DIFFERENTIATION AS REFLECTED IN THE CERAMICS. Archaeological excavation has indicated that the Kingdom of Chimu on the North Coast of Peru possessed a stratified society; this is further borne out by the evidence from the ceramics manufactured by these people. At least two distinct classes or castes are represented on the pottery; these are distinguished not only by the activities in which they are engaged, but also by their dress and ornament and, in some cases, by their placement on vessels representing Chimu buildings. Supporting data from the Spanish chronicles are also presented. (9)

Hudson, Luanne B. (USC) ST. GEORGE AMIDST THE CLASSIC MAYA: SERPENT SLAYING AS REPRESENTED ON CERAMIC VESSELS. An almost identical scene found on various Classic Maya ceramic vessels is described and interpreted. Two serpent forms are represented: one is of an undulating serpent whose body is pierced by a spear; the other is of a serpent's head. Other vessels and sculptural forms with serpents depicted were also studied in order to determine if they could be separated into different categories. Based on the analysis, it is suggested that: (1) this was a unique scene, (2) it was mythological, (3) the paired serpents represented two distinct types, and (4) the scene was connected with some form of ancestral rite. (27)

Hunter-Anderson, Rosalind (New Mexico) THE RISE OF MATRIFOCALITY IN THE WESTERN PUEBLO REGION. A theory for the rise of matrifocality (matrilineal kin reckoning and matrilocality) in the WPR is proposed. Initial selective contexts for matrifocality occurred toward the end of the Basketmaker Period (ca. 500-800 A.C.E.), derived from a shift from primary winter dependence on live game and stored wild plants to more emphasis on horticultural food for winter consumption. Archaeological correlates of attendant social organizational changes will be discussed. (38)

Huse, Hannah (Archaeological Associates, Inc.) THE BISTI-STAR LAKE CULTURAL RESOURCES INVENTORY. During the summer of 1977, Archaeological Associates, Inc., a private contracting firm headquartered in Boulder, Colorado, conducted a Class II sample inventory of cultural resources (both prehistoric and historic) to be found on Bureau of Land Management holdings in northwestern New Mexico. The contract called for survey of 59 square miles (37,610 acres) leading to the location of 421 sites with 523 components of occupation. In addition, 267 isolated artifacts were recorded. Principally Archaic and historic Navajo sites were found with

lesser numbers of Pueblo and Paleo-Indian artifacts. The collected information is to be used in designing an Environmental Statement and mitigation program in advance of coal stripping to begin in 1980. (45)

Isbell, William H. (SUNY-Binghamton) HUARI URBAN CONFIGURATIONS. The development of urban configurations characterizes the transformation from the Early Intermediate Period to the Middle Horizon in the Valley of Ayacucho. Based on the preliminary results of the Huari Urban Research Project, these Ayacucho urban patterns are described and future research strategies are considered. (4)

Ives, David J. (Missouri-Columbia) THE USE OF TRACE ELEMENTS IN FINGERPRINTING THE CRESCENT HILLS PREHISTORIC QUARRYING AREA. While an important raw material for the prehistoric inhabitants of North America, chert presents a number of problems for the analyst. Equally so, the archaeologist faces a number of problems in assigning chert from archaeological contexts to geological contexts. The analysis of chert from an eastern Missouri prehistoric quarry is used as an example of the steps that can be taken to ameliorate both analytical and interpretive problems. (43)

Ives, David J. (see Evans, D. R.) (13)

Jacobs, Linda K. (Oregon) THE ARCHAEOLOGICAL IMPLICATIONS OF A VILLAGE IN TRANSITION: THE CASE OF TELL-I NUN, IRAN. A census of a small agricultural village in southwestern Iran provides substantive data for estimation of population in archaeological contexts. The implications for such estimates are explored, and alternative methods for estimating population are suggested, based on additional ethnographic data. The social structural changes in the village, as they are reflected in architectural changes, are outlined; the problems of understanding such changes archaeologically can perhaps be solved by some of the alternative methods for estimating population mentioned above. (44)

James, Gregory B. (Wisconsin-Milwaukee) ANALYSIS OF FIGURINES FROM THE PUEBLA PRE-CLASSIC. Excavations and site survey conducted in the Puebla Valley between Cholula and the Valley of Tehuacan have yielded several hundred ceramic figurines. The extreme sensitivity of clay figurines to variation in style suggests the utility of multivariate statistical analysis in identifying variation that is temporally sensitive. Further analysis based on these statistical manipulations is then possible. (40)

James, Steve R. (Utah) AN ARCHAEOLOGICAL RECONNAISSANCE IN THE UPPER REACHES OF THE BLACK ROCK DESERT, NORTHWESTERN NEVADA. In the summer of 1976, the Bureau of Land Management conducted a cultural resources survey at the foot of the Pine Forest Range in the upper Black Rock Desert, an arm of Pleistocene Lake Lahontan. Although previous surface archeology in the Black Rock Desert has yielded a number of early projectile points representative of lacustrine adaptations of the Western Pluvial Lakes Tradition (9,000-6,000 B.C.), the evidence from this survey indicates instead reliance upon springs after the desiccation of the region. Within a short radius of a few springs, seven large lithic scatters and thirty smaller ones were identified and recorded. Samples of the lithic artifacts and materials were analyzed in terms of chronology, environment, and subsistence of the area. (5)

Janney, Dawn E. (Arizona State Museum) PREPARING LARGE SAMPLES FOR COMPUTER ANALYSIS. As part of the Arizona Public Service Cholla-Saguaro Mitigation Project, information from a sample of over 800 previously recorded sites was collected, coded, and keypunched for computer analysis. Problems encountered in standardizing the data base and investigating its internal consistency are discussed. Variable selection and coding form design are presented from the perspective of assuring accurate and efficient conversion of raw data into computer-manipulable representations, and time requirements of various stages of data collection and preparation are given. (15)

Jansen, Maarten (see Josserand, J. K.) (49)

Jefferies, Richard W. (Georgia) LITHIC ARTIFACT DIVERSITY AS A MEANS OF DISCERNING INTER-SITE ACTIVITY VARIABILITY. The paper is a report on the results of analysis of lithic artifact variability among Woodland Period sites in the Lookout Valley area of northwest Georgia. Various categories of flaked stone tools and debitage are utilized as attributes in an attempt to discern patterns of inter-site activity diversity in the research area. Site activity variability is discussed with respect to site location, distance to lithic resource acquisition areas, and other environmental variables. (19)

Jewett, Roberta A. (Arizona State) SOCIAL AND SETTLEMENT ORGANIZATION IN TONTO BASIN, CENTRAL ARIZONA. Regional studies and surveys have received increasing attention in the

archaeological discipline with a concomitant concern regarding the degree to which survey data is adequate for making behavioral inferences. Data resulting from a survey recently conducted in Tonto Basin, central Arizona, is examined with respect to particular population and spatial variables. The variables discussed are density, agglomeration, hierarchy, differentiation, and evenness. Morrill's measure of contiguity and the nearest neighbor statistic are used for measuring the spatial patterning of sites located by quadrat and transect sampling units. Patterns resulting from the analysis and their behavioral implications are discussed. (38)

Jimenez-Moreno, Wigberto (INAH) SAHAGÚN IN THE INTELLECTUAL CONTEXT OF HIS TIME. This paper presents new information about Sahagún's biography, placing him in the intellectual context of his time, in order to understand how he developed his extraordinary capacity as an ethnologist, historian, and linguist. This work represents a new attempt to fully appreciate the context of his work. (16)

Johnson, Donald Lee (Illinois-Urbana) SOIL-GEOMORPHIC AND SOIL-ARCHAEOLOGIC RELATIONSHIPS, OSAGE RIVER BASIN, WESTERN OZARK HIGHLAND. On Holocene-aged river terraces of the Western Osage River Basin, Missouri, a consistent relationship exists between soil type and degree of soil profile development versus geologic age of the parent material and topographic position. This relationship is seminal to soil-archaeologic relationships. Archaic and Paleo-Indian cultural materials, for example are not found *in situ* in Udifluvent profiles, nor may Woodland materials be expected within Eutrochrept profiles, excepting plow layers. Among soils in the area, bottom lands (Entisols, Inceptisols, Alfisols) had maximal nutrient potential for Woodland horticulture, though other non-nutrient factors may have operated. (26)

Johnstone, Joel C. (see Wood, J. S.) (24)

Jones, Kevin T. (Colorado State) PALEOENVIRONMENT AND PREHISTORIC SETTLEMENT PATTERN IN THE SAN LUIS VALLEY, SOUTH CENTRAL COLORADO. The discussion will center on the results of archaeological test excavations of three prehistoric sites in the Dry Lakes area of the San Luis Valley. A cultural component was encountered in which profuse amounts of fish bones were deposited. Identification of the bone revealed that a genus of fish (*Ictiobus*) was represented which was not previously known to be native to Colorado. The present day environmental conditions of the area are such that this fish could not survive. Assuming conditions necessary to support an *Ictiobus* population, a close correlation is demonstrated between the paleoenvironment and prehistoric settlement patterns. (47)

Josserand, J. K. (INAH) MIXTEC DIALECTOLOGY: INFERENCE FROM LINGUISTICS AND ETHNOHISTORY. Recent linguistic studies establish dialect areas and ordered phonological developments within Mixtecan; ethnohistory and linguistics collaborate to provide evidence for dating phonological changes in the development of Mixtec dialects, and for testing hypotheses relating to the socio-political dominance of certain centers (Teposcolula, Achiutla, Yanhuitlan, Tututepec). The extent of dialect areas in early contact times may be documented through archival research. Varieties of Mixtec encountered in early documents (especially 16th century) are related to present-day Mixtec dialects. The proposition that the Teposcolula dialect was imposed by scribes as a 'standard' variety in the central Mixteca Alta is investigated. (49)

Justeson, John S. (see Hampson, Steven E.) (2)

Karwedsky, Robert A. (Florida State) ARCHAEOLOGY OF MOUNDS A AND B AND PLATEAU, OCMULGEE NATIONAL MONUMENT. Intensive excavations by the WPA in the southeast were responsible for formulating the basis of much of our knowledge of southeastern archaeology. Work under the direction of Dr. A. R. Kelly in what became Ocmulgee National Monument was particularly important to central Georgia archaeology. The material excavated from Mounds A and B at Ocmulgee in 1934-1938 and 1967 has been analyzed for the National Park Service by Florida State University. Results of this analysis have allowed the reconstruction of the Mound A ramp, reconstruction of aboriginal alteration of the plateau, and the integration of this area into the archaeology of the Macon Plateau and central Georgia. (46)

Kaschko, Michael W. (Hawaii) HAWAIIAN SOCIAL UNIT BOUNDARIES AS ARTIFACTS. This paper demonstrates a means of archaeologically defining primary and secondary localized groups in Hawaii through the reconstruction of prehistoric boundary systems. Three bodies of information were utilized: the ethnohistoric sources describing Hawaiian land division in general, the original Hawaiian land grant descriptions and survey records for the specific areas, and the distribution patterns of actual archaeological features (especially prehistoric trails). The recognition of such land-social unit boundaries as artifacts holds great potential for the archaeologist in approaching, synchronically and diachronically, problems of prehistoric Hawaiian social, economic, and political organization. (14)

Kay, Marvin (Illinois State Museum) NEW INTERPRETATIONS OF RODGERS SHELTER AND PHILLIPS SPRING. Renewed excavation and analysis of Rodgers Shelter and Phillips Spring, initiated in 1975 as part of the mitigation program for Truman Reservoir, Missouri, have added substantively to our information on subsistence, community layout, stylistic and techno-functional indices for preceramic and ceramic complexes of the western Ozark Highland; and has defined the earliest evidence of tropical plant husbandry (4,300 B. P.) in eastern North America. This paper surveys the major highlights of this research which deals with a nearly complete Holocene archaeological sequence. (26)

Kelley, Ellen Abbott (Sul Ross) SIPAPU AND PYRAMID TOO: THE TEMPLE OF THE CRYPT AT ALTA VISTA, CHALCHIHUITES. The Temple of the Crypt at Alta Vista, originally a free-standing tomb of a high status individual, later was incorporated into the basal platform of a two-story temple. The temple itself was an elevated room, while the basement room contained the crypt. The analogy to an above-ground rectangular kiva with a sipapu in the floor used as god-entry is obvious. Superimposed constructions converted the structure into a stepped Mesoamerican pyramid. This development suggests that some southwestern kiva-sipapu complexes are analogous to some Mesoamerican pyramid-tomb complexes and that both complexes have a common Mesoamerican origin. (37)

Kelley, J. Charles (see Kelley, E. A.) (37)

Kelly, Robert (see Thomas, D. H.) (5)

Kikuchi, William K. (Kauai Community College) THE EVOLUTION OF HAWAIIAN AQUACULTURE. Hawaiian aquaculture was a prehistoric native innovation. Its roots were to be found in the development of irrigated agricultural pondfields. Architectonic aquacultural sites, whether found as inland pondfields or along coastal areas, were simply considered to be extensions of agricultural technology. The evolution of the pondfields and fishponds had a significant ecological and cultural impact on the native society. Ecologically, pondfields and fishponds became artificial estuaries enriching the natural riverine and marine environments. Culturally, their evolution paralleled the development of the elite class and, increasingly, became one of the symbols and manifestations of religious, political, and economic power. (14)

Kimery-Lees, Kathryn M. (see Lees, W. B.) (46)

Kincaid, Chris (BLM Phoenix District) IMPACT ASSESSMENT THROUGH STRATIFIED RANDOM SAMPLE INVENTORY FOR THE BLACK-CERBAT ES, NORTHWESTERN ARIZONA. This paper discusses ways that inventory information derived from general, environmentally stratified statistical samples can be brought to bear on specific land management applications. Archaeological site data for the Black-Cerbat ES were gathered using stratified, random sample inventory methods, without direct regard to proposed project areas or grazing allotments *per se*. This required that new analytical techniques be developed to give reliable impact assessments for a wide variety of small, surface-modifying projects scattered over nearly 2 million acres. The paper highlights the difficulties of using traditional types of cultural resource management information in preparing highly specific, project-related ES input. (48)

King, Frances B. (Illinois State Museum) CULTURAL, CLIMATIC AND EDAPHIC FACTORS INFLUENCING VEGETATION. Examination of the "presettlement" vegetation, as recorded by government surveyors in the early 1800's, finds many presently forested areas where vegetation was recorded as "open barrens" or prairie, suggesting that some agent, probably fire, was modifying the environment. Whether or not fire was intentionally used to manipulate the vegetation, the result was, at least in late Holocene time, a forest and prairie mosaic with large areas of ecotone and more abundant and diverse plant resources than occur in similar but undisturbed areas today. Based on more western analogs, the earlier "Hypsithermal" dry interval was probably more open on the uplands with proportionately greater percentages of plant resources concentrated in the river valleys and floodplains. (26)

King, James E. (Illinois State Museum) BIOGEOGRAPHY OF THE WESTERN OZARK HIGH-LAND: THE POLLEN EVIDENCE. By 12,000 years B.P., spruce and related "northern" species disappeared from the western Ozarks, and were replaced by a mesic oak-dominated deciduous forest that persisted until 8,500 B.P., when there was a climatic shift to the drier hypsithermal. Declining forest density, replacement of mesic species by xeric, and the eastward migration of the prairie/forest border characterizes the hypsithermal. About 5,500 B.P., increases in forest density and declining herbs suggest the return of a more equitable climate. However, the continued absence of some mesic species indicates that the post-hypsithermal climate remained somewhat dry, even to the present. (26)

King, Mary Elizabeth (Pennsylvania University Museum) THE SANDALS FROM HINDS CAVE, VAL VERDE COUNTY, TEXAS. In the 1974 through 1976 field seasons, Hinds Cave produced 91 sandals, or sandal fragments, of at least six distinct types. The chronological sequence of sandal types, their relationship to types in neighboring areas, and unique features will be discussed. (28)

Kinkade, Gay M. (BLM Safford District) STRUCTURED RECONNAISSANCE SURVEY FOR THE SAN SIMON-GILA ENVIRONMENTAL STATEMENT, SOUTHEASTERN ARIZONA. This paper reports on the preparation of the cultural resources portions of the Bureau of Land Management's San Simon-Gila Environmental Statement, recently published in draft form. Because of time and manpower constraints, survey was limited to a modified reconnaissance strategy, treating grazing allotments as individual survey areas. The cultural resource data collection and impact analysis methods used and their applicability to other environmental assessments and planning documents are discussed. The use of reconnaissance surveys is examined and the conclusion drawn that they can yield substantial and valid data for making sound predictions on site distribution and density. (48)

Kirch, Patrick V. (Bishop Museum) ECOLOGICAL PERSPECTIVES ON PREHISTORIC HAWAIIAN MARINE EXPLOITATION. While archaeologists in the Hawaiian field have provided a solid framework in the typological analysis of the material culture of fishing, a broader and integrating theoretical perspective is required. Stress needs to be laid on the definition of variability and constraint in environment, and of cultural response to this ecological matrix. Functional analyses of fishing gear, faunal analyses, and environmental studies of contemporary marine ecosystems and resources are among the methodologies that can be integrated by an ecological paradigm. Recent and continuing investigations in Hawaii provide a data base upon which the appropriateness and utility of such a paradigm may be tested. (14)

Klager, Karol J. (see Baker, L. L.) (6)

Klein, Terry (SIU-Carbondale) EXAMINATION OF CHANGE IN SOCIAL GROUP SIZE ON BLACK MESA. Anthropologists have assumed both implicitly and explicitly that there is a consistent relationship between bounded space and social group size. This proposal is examined in light of existing archaeological data. A method is constructed whereby bounded space is used to measure change in social group size on Black Mesa. A range of variables that presumably affect the size of bounded space are examined in detail. (22)

Klesert, Tony (SIU-Carbondale) REGIONAL VARIATION ON BLACK MESA: A COMPARISON OF DISCRETE AREAS. Preliminary investigations of the extreme northern canyons area of Black Mesa suggest this area has a culture history and organizational strategies dissimilar to that of areas to the south, being directly investigated by the Black Mesa Archaeological Project. The initial discoveries in this extreme northern area of Black Mesa are summarized and compared to the extensive data base available from the southern areas. In light of this additional data base it is suggested that certain previously accepted conclusions concerning "northern Black Mesa" should be altered. (22)

Klymyshyn, Alexandra M. Ulana (California-Santa Barbara) SOCIAL ORGANIZATION IN AN IMPERIAL CAPITAL. Chan Chan is known to have been the capital of the Chimú empire on the basis of information contained in the chronicles. Could we have identified Chan Chan as an imperial capital solely on the basis of archaeological remains? Comparison of Chan Chan with other Chimú urban sites points out archaeological remains that are specific to the capital. These remains are discussed in reference to possible differences in social organization in the capital as opposed to different parts of the empire. In conclusion, Chan Chan is compared with other known imperial capitals. (9)

Knoerl, John J. (SUNY-Binghamton) DATA RESOLUTION IN MEASURING SITE LOCATION IN HEAVILY VEGETATED AREAS: METHODOLOGY AND TECHNIQUES. Archaeologists and planners require accurate measurement of parameters such as site size and intrasite variability for research and management decisions. Often archaeological sites are located in situations where measurement of these parameters is costly. Since resolution of data relevant to defining site size and intrasite variability is a direct function of cost, the goal is to increase resolution while reducing cost. Shovel test pits (cylinders 30 cm in diameter) placed at regular intervals provide broad coverage and allow the observation of spatial data variation. Twelve sites in southeastern New York State, representing a majority of the area's known site types have been subjected to our shovel test pit methodology. The analysis shows great promise in increasing our ability to estimate site size and intrasite variability. (13)

Knudson, Ruthann (Idaho) ALICE IN WONDERLAND: THE EXPERIMENTS AND EDUCATION OF AN ARCHAEOLOGICAL NON-CHEMIST IN THE WORLD OF NON-OBSIDIAN LITHIC TRACE

ELEMENT ANALYSIS. Neutron activation and x-ray fluorescence analyses have been conducted on materials from western Nebraska and the northern Rocky Mountains. This has been more in the nature of education and experimentation than in finished products, but it is now possible to outline the cost, time, sample preparation and array, and instrument needs of these analyses. With the development of a better understanding of data comparability, and of base data from a wide array of sources, significant steps are being made in the use of non-obsidian trace-element data in identifying prehistoric lithic materials. (43)

Knudson, Ruthann (see Sappington, R. L.) (11)

Kobori, Larry S. (see Seck, Susan M.) (5)

Koerper, Henry C. (California-Riverside) THE PRIMARY CULTURAL PROCESSES TOWARDS A UNIFIED GENETIC ANALOGUE MODEL OF CULTURE CHANGE. "Process" is a term that appears frequently in the terminology of scientific archaeology. However, the term itself has been little discussed, and subsequently its meaning remains unclear. A general definition of the term is provided in this paper. Moreover, four primary processes of culture change are offered. They are based on a valid analogy with the four basic mechanisms of biological (phylogenetic) evolution, and their explication provides a basis for a unified genetic analogue model of culture change. It is maintained here that archaeology can productively study culture change in view of these concepts of the primary cultural processes. (6)

Kosakowsky, Laura (Arizona) LITHIC USE WEAR RESEARCH AT THE UNIVERSITY OF ARIZONA. This report discusses current research being carried out at the University of Arizona in lithic use wear analysis. Previous lithic use wear research has almost universally suffered from two major deficiencies: (1) the use of a single rock type for experimentation so that results are not necessarily comparable to other rock types; and, (2) a lack of quantification of use wear so that experimental data cannot be objectively related to prehistoric materials. Our research has focused on defining measurable attributes of rocks that determine the formation of lithic use wear so that our results will not be limited to a single rock type. Furthermore, we are seeking and experimenting with techniques that will allow the quantification of use wear. (25)

Kowalewski, Stephen A. (CUNY-Hunter) GROWTH AND NON-GROWTH IN THE PAST AND PRESENT VALLEY OF OAXACA, MEXICO. Survey data from 280 km² surrounding Monte Albán, the ancient Zapotec city, show settlement patterns alternating through time between two modes, growth and non-growth, with associated demographic, hierarchical, and land use characteristics. This is also true for the 550 km² just to the south, but the modes are not completely synchronized with the central area. To explain this variability, a model based on optimal land use assumptions is evaluated. Results suggest processes similar to cases of uneven economic development in modern regions and have implications for the Colonial and contemporary Valley of Oaxaca. (29)

Kowalski, Jeff Karl (Yale) THE ICONOGRAPHY OF THE CENTRAL MOTIF OF THE HOUSE OF THE GOVERNOR AT UXMAL. The iconography of the central motif of the House of the Governor has implications for the building's function and Uxmal's political role. Formal parallels to the central motif's seated figure and hieroglyphic serpent bars are encountered on accessional stelae at Piedras Negras. Figurines depicting Piedras Negras iconography were found at Jonuta, while figurines from Isla del Carmen and Jaina present amalgamations of forms allied to Piedras Negras and Uxmal. Piedras Negras rulership symbols were transported to and persist at the House of the Governor, suggesting their application as symbols for political power and prestige of the lords of Uxmal. (27)

Krotser, Paula Homberger (Veracruzana) DISTRIBUTION OF MAJOR CERAMIC WARES PRODUCED AT TEOTIHUACÁN. We will present new data on the ceramic industry of Teotihuacán during the Xolalpan and Metepec Phases. Identification of the principal workshop areas and a refined chronology based on stratigraphic excavations permits us to define certain major wares that were produced and marketed in Teotihuacán during the two latter phases of the city's life. We will discuss San Martin Orange, Coarse Thin Orange, Copá, and Coarse Matte wares. (21)

Kus, James S. (California State-Fresno) THE PROGRAMA RIEGO ANTIGUO. For the past two years, the Programa Riego Antiguo has carried out a study of the prehispanic agricultural features of the lower Moche Valley, Peru. Precise survey and mapping of the indigenous water management system has been accompanied by excavation and analysis programs that have provided information on hydrology, canal engineering, field and furrow design, and native crops. The research goal has been to outline the factors governing agrarian expansion, reform, and collapse, thereby achieving an empirical understanding of irrigation and its consequences. (17)

Kvamme, Kenneth L. (Colorado State) A MULTIVARIATE MODEL FOR PALEO-DEMOGRAPHY: A SOUTHWESTERN EXAMPLE. A general demographic model is presented that offers a procedure for estimating the size of prehistoric settlement populations. The model examines multiple measures of utilized space and through multiple regression relates these measures to population size. The demographic model is applied to recent data on the Southwestern Pueblos. Difficulties in obtaining reliable census figures and spatial data are discussed. Several models are presented that offer the most precise and tenable estimates of pueblo population size yet available. Problems in the application of the models to prehistoric pueblos are discussed, and procedures used to test the viability of projecting a model into the past are examined. (45)

Ladd, Edmund J. (NPS) HAWAII ISLAND DRYLAND AGRICULTURE. Recent field studies in the Puna-Kau District of Hawaii Volcanoes National Park have revealed a variety of structures and features associated with what appears to be dryland agriculture. The field structures are examined and discussed on the background of traditional land use systems, population, environmental impacts, and historical adjustments. (14)

Lange, Frederick W. (Museo Nacional de Costa Rica) THE RUIZ SITE: A LATE POLYCHROME OCCUPATION NEAR THE BAY OF CULEBRA, COSTA RICA. The predominance of Late Polychrome (1,200 to 1,600 A.D.) materials at the Ruiz Site near the Bay of Culebra contrasts with that of earlier periods in sites closer to the Bay. Subsistence and settlement data are contrasted with other Pacific coastal Costa Rican and Nicaraguan sites in continued attempts to elucidate patterns of regional adaptation. The recovery of a *cire perdue* mold fragment at the site, and the more recent find of a small gold ornament in a nearby area, are the first positive evidence of the actual working of gold in the area. (32)

Lange, Richard C. (Arizona State Museum) SAMPLE CIRCLES: AN EFFECTIVE APPROACH TO SAMPLING LARGE SURFACE SITES. Sample circles can perform several functions as part of a sampling strategy for a site. As a form of sampling, this approach provides an alternative to a 100% collection of extensive sites. Problems that can be addressed are: boundary definition; assemblage composition, homogeneity, and distribution; and cluster size and location. Sample circles are a particularly efficient means of dealing with such questions because they are easy to establish and are amenable to collection by several techniques with varying degrees of provenience control. (6)

Larralde, Signa (Denver) SHARED AESTHETIC TRADITIONS: POTTERY AND TEXTILE DESIGN RELATIONSHIPS IN ARIZONA, 1100-1350. It was hypothesized that: (1) well-established regional aesthetic traditions in Pueblo III Arizona resulted in ceramic and weaving products with designs similar to each other; (2) craftsmen in areas of cultural mix (i.e., Salado and Sinagua areas) produced ceramics and textiles with designs unlike each other and like the original traditions that inspired them. A design sample was coded using the Hatcher Art Analysis tally sheet. Results indicated significant regional consistencies in major and minor symmetry, layout, color, line and composition of design for both crafts except in areas of cultural mix, where these consistencies in design did not occur. (38)

Leach, Helen M. (Otago-New Zealand) MIND WITHIN MATTER: DISCOVERING THE TECHNOLOGICAL KNOWLEDGE OF EARLY NEW ZEALANDERS. The study of stone tools in New Zealand was long dominated by the classification of finished adzes whose varying patterns of flake scars had been obliterated by polishing. Excavation of an argillite adze workshop in southern New Zealand provided an opportunity for establishing the complete production sequence of several adze 'types.' A jigsaw analysis of a silcrete blade-manufacturing site of the same people showed that although production of prismatic cores involved a different procedure, similar skills were evident. Thus, a comparison of two distinct production sequences reveals a common core of stone working knowledge probably shared by other early East Polynesians. (33)

Leblanc, Catherine J. (see D'Altroy, T. N.) (23)

Lees, William B. (South Carolina) FORM AND FUNCTION OF COLONO-INDIAN POTTERY IN AN HISTORIC PLANTATION CONTEXT. During the historic period, various Southeastern Indian groups are known to have produced a trade ware currently referred to as Colono-Indian pottery. The precise forms and socioeconomic correlates of this ware are as yet poorly understood. An analysis of the intrasite variability of Colono-Indian ceramics from the Limerick Plantation Site (38BK223), an 18th and 19th century rice plantation in coastal South Carolina, was conducted, with the resultant data being compared to that from other sites on which Colono-Indian wares occur. This consideration of form and functional distribution indicates, among other things, a heavy reliance of Colonial and Ante-bellum populations of various ethnic origins on Colono-Indian wares. (46)

Lerner, Shereen A. (Arizona State) ANALYSIS AND FUNCTIONAL INTERPRETATION OF BLACK MESA CERAMICS. Formal differences between ceramic types are evident in a sample of rim sherd from ten sites excavated during 1977 by the Black Mesa Archaeological Project. Non-random association of physical attributes define the types. Functional interpretations of these associations are developed and then tested by examining the distribution of different types at both the intrasite and intersite levels. (22)

Levy, Janet E. SOCIAL ORGANIZATION IN BRONZE AGE DENMARK. Archaeological correlates of hierarchical social organization are sought in the Danish Bronze Age hoards. The evidence for a complex sumptuary system and its interaction with the ritual system are discussed. (44)

Levy, Richard (Kentucky) THE LINGUISTIC PREHISTORY OF CALIFORNIA: A PROCESSUAL VIEW. An argument is made for the use of historical linguistics in a processual framework. Linguistic change in Central California is examined with respect to interaction among language families and with respect to the social and ecological contexts in which linguistic change occurs. Attention is focused on six language families (Pomo, Western Miwok, Costanoan, Yokuts, Sierra Miwok, Maidu) and the nature of the relations of these to each other and to the ecological context during the process of change. The expansion of these six language families is intimately associated with the cultural changes of the Late Horizon in Central California prehistory. (11)

Lewenstein, Sue (Arizona State) AN ANALYSIS OF EXPERIMENTALLY PRODUCED EDGE DAMAGE ON OBSIDIAN BLADES. In order to determine the prehistoric function of obsidian blades recovered from Classic period deposits on Patarata Island, Veracruz, Mexico, an experimental sample of obsidian blades was manufactured and used to process a variety of raw materials presumably exploited by early Mesoamerican coastal groups. Subsequent to use, edge damage data were collected for all 165 experimental tools. Factor and discriminant analyses have been successful in isolating wear patterns corresponding to several use categories. These results suggest the possible function of the Veracruz assemblage, both in terms of raw material and type of motion involved during use of the blades. (25)

Lewis, Kenneth E. (South Carolina) SETTLEMENT PATTERN AND FUNCTIONAL VARIATION OF THE SOUTH CAROLINA FRONTIER. The evolution of frontier settlement in the interior of South Carolina reflects adaptations to the attenuated social and physical environment present in the area undergoing colonization. Regional economic and subsidiary centers of wheat production were arranged in a dendritic pattern focused on the entrepot of Charleston and only with rare exception did substantial settlements arise that were not linked with this network during the frontier period. The archaeological investigation of one linked center—Camden—and one non-linked center—Long Bluff—reveals variations that might reflect the functional differences of these two settlements. (2)

Lewis, R. Barry (Illinois-Urbana) RESOURCE DISPERSION AND HUNTER-GATHERER BAND SPACING. A hunter-gatherer site dispersion model is described which is based on the assumption that hunter-gatherers tend to maximize time and energy efficiency in staple food-getting. Predictions concerning the dispersion of hunter-gatherer sites with respect to aggregated and regularly dispersed resources are examined against data for Archaic hunter-gatherers in eastern Illinois. (47)

Lightfoot, Kent G. (Arizona State) FOOD REDISTRIBUTION IN THE PREHISTORIC SOUTHWEST. Recently several archaeologists have examined intra- and inter-community food exchange within the prehistoric Southwest as a social process enabling people to subsist in an unpredictable environment. Within any year the productivity of a given plot of land may vary significantly with fluctuations in the pattern of rainfall, frost, wind, etc. The social networks linking communities enable food to be distributed from areas of relative abundance to those of scarcity. The problem posed in this paper is determining the maximum size of the social network in which food could be redistributed efficiently on a regular basis. The cost of transporting food by foot over various distances is used in determining this. (45)

Lightfoot, Kent G. (see Francis, Julie E.) (6)

Limp, W. Frederick (Indiana) SUBSISTENCE CHANGE AND OPTIMIZATION THEORY. Recent parallel theoretical and methodological developments in economics, economic anthropology, and ecology present the archaeologist with an almost unique opportunity to develop a comprehensive synthetic body of theory to deal with the diachronic problems of subsistence change. Using such a framework in a preliminary form, the specific problem of differential utilization of resource zones by prehistoric groups with differing productive technologies will be examined using data from the riverine Midwest. (36)

Linford, Laurance (see Kosakowsky, L.) (25)

Lipe, William D. (Washington State) CENTRALIZED STORAGE AT MOON HOUSE, A PUEBLO III CLIFF DWELLING IN SOUTHEAST UTAH. The main building and occupation phase at this site of approximately 45 structures was in the 1260's; it was probably one of the last Pueblo sites on Cedar Mesa. The site's storage capacity evidently served a group larger than the few persons who lived there. It also seems to have been a focus for ritual activity, and a portion is fortified. Implications of these findings for interpreting the regional settlement system are explored. (30)

Long, Jeffrey C. (see Merbs, C. F.) (38)

Long, Jeffrey C. (see Utermohle, C. J.) (38)

Lopinot, Neal H. (see Canouts, V.) (35)

Lord, Kenneth J. (Texas-Austin) VERTEBRATE REMAINS FROM HINDS CAVE: A COMPUTER METHODOLOGY. An extensive collection of vertebrate remains were recovered from the archaeological excavations at Hinds Cave. This information consists of mammalian, reptilian, avian, and fish bones from all levels of the site. A computer program has been devised to quantify this information into stratigraphic levels in an attempt to recognize human procurement and consumption patterns. These data will also be used as an aid in constructing a model of the past environment. (28)

Lucius, William A. (Archeological-Environmental Research Corporation) THE CENTRAL AND SOUTHERN COAL PROJECTS OF UTAH: METHODS AND RESULTS OF ANALYSIS FOR TWO LARGE-SCALE CONTRACTS. The amount and variety of data collected for the Central and Southern Coal Projects of southern Utah from the sampling surveys and research on previously recorded sites required implementation of computerized data storage and retrieval in order to evaluate the effects of coal development on cultural resources. With the aid of cross-tabulations for the various environmental and cultural variables, it was possible to produce statements on culture history, ecological parameters of site location, and cultural affiliation of site types. These data, when used in conjunction with the other basic research undertaken for the project, resulted in predictive models of site type, location, cultural affiliation, and density given known environmental setting. (20)

Luedtke, Barbara E. (Massachusetts-Boston) TRACE ELEMENTS AND TRADE IN PREHISTORIC MICHIGAN. Trace element analysis of cherts can be a productive means of approaching numerous problems in prehistory, but like any other procedure it must be undertaken with care if valid results are to be obtained. This paper will assume that laboratory procedures are appropriate and that sources have been adequately characterized and will focus on the problem of assigning artifact samples to sources. Several methods of assigning unknowns will be discussed and compared. The resulting data are then applied to a study of chert distributions on Late Woodland sites in Michigan, delineating trade networks and interaction patterns. (43)

Luedtke, Barbara (see McDonough, W.) (33)

Lynott, Mark J. (NPS) HUNTING AND GATHERING SITE TYPES AND ASSEMBLAGE VARIABILITY IN THE SOUTHERN ROLLING PLAINS. Analysis of hunting and gathering settlement systems has often focused upon forcing sites into generalized typologies. This approach has disguised the extreme variability that exists in hunting and gathering adaptive systems. Research in the Upper Colorado River drainage in west central Texas has been designed to evaluate the kinds of activities conducted at sites and to explore the variability of sites in regard to the interpreted activities. This approach revealed a significantly more complex functional situation than is frequently recognized in hunting and gathering contexts. (35)

Lyons, Thomas R. (NPS) NON-DESTRUCTIVE ARCHAEOLOGY AND REMOTE SENSING: A THEORETICAL AND METHODOLOGICAL STANCE. The concepts of a non-destructive approach to archaeology, which will be of increasing import as cultural resources management responsibilities mount in this country, are outlined and their scientific credibility explored. While archaeology has long relied on techniques that disturb and often obliterate prehistoric remains, research and applications of remote sensing have led to advances that make a non-destructive orientation both feasible and efficient. The converging historical, professional, managerial, and technological currents that influenced the development of this stance are defined, and conclusions are drawn concerning the role of extractive techniques such as surface collecting and excavation. (24)

Mack, Joanne M. (Oregon) A CERAMIC TRADITION FROM THE SISKIYOU MOUNTAINS OF SOUTHWESTERN OREGON. The ceramics from three archaeological sites along the Upper

Klamath River in Oregon are described and the possible relationships between these ceramics and other ceramic traditions in western North America are explored. The pottery from these sites and other sites along the upper courses of the Klamath and Rogue Rivers has been named Siskiyou Utility Ware. From the evidence it seems to be an independent pottery tradition that may well have developed out of a California Ceramic Tradition base. (11)

Mackey, Carol J. (California-Northridge) A RE-EVALUATION OF THE NORTH COAST HUARI STYLE. The ceramic style referred to as both "Huari Norteno B" and "Red-white-black Geometric" emerged on the north coast after the fall of Huari. Survey and excavation in the Moche Valley shows this three color style to be of low frequency and contemporary with Chimú style ceramics. The characteristics of the three color Red-white-black style are examined, and it is found that although the style is a marker for the end of the Middle Horizon, it is not necessarily an indicator of Huari/Pachacamac influence. (4)

Madsen, David B. (Utah) THE CONCEPT OF AN EARLY ARCHAIC: FACT OR FANTASY. Preliminary results of survey and test excavations in the Deep Creek Mountains in west central Utah indicate occupation of the area by at least four prehistoric groups. A possible Paleo-Indian occupation is tentatively suggested by lithic techniques. Archaic and Sevier (formerly termed Fremont) occupations are found sequentially in test excavations of two rockshelters. A Goshute occupation is known historically and may be represented by Paiute-Shoshonean pottery at several sites. Dating of these sequences supports the thesis that there is no evidence of Archaic cultures in the eastern Great Basin prior to 860 B.P. Surface finds of fluted points and the presence of large herbivores, such as mammoths at 10,000 B.P. or later suggests that early sites in the eastern Great Basin may well represent Paleo-Indian occupations, rather than Archaic. (5)

Malcomson, Richard D. (BLM Arizona Strip District) COMBINED EXTERNALLY BIASED AND RANDOM CLUSTER SAMPLE INVENTORIES IN THE VERMILLION ES AREA, NORTH CENTRAL ARIZONA. In preparation for the Vermillion Environmental Statement, proposed range improvement projects in the ES area were intensively surveyed, yielding a sample of 3,826 acres biased by range management considerations. An additional sample of 20,480 acres followed Mueller's "cluster scheme" strategy, using the township-range system rather than cultural or environmental criteria for stratification. This approach is economical, hypothetically provides a small-scale replica of the universe being sampled, and allows a field test of Mueller's site data manipulations from the Paria Plateau (a part of the ES area). Analysis of the data uses Mueller's statistical approach, making the results comparable. (48)

Marmaduke, William S. (Museum of Northern Arizona) THE GROWTH AND DEVELOPMENT OF THE PREHISTORIC COMMUNITY AT COTTONWOOD SEEP. The Coronado Power Station railroad spur passes through Cottonwood Seep, a perennially flowing spring at the edge of the Puerto River valley. From A.D. 500 until A.D. 1300, the seeps district was continually occupied, but not uniformly so. This paper will identify the changes that occurred in the Seep settlement and will interpret the changes in terms of regional prehistory and ecological adaptations over time. Discussion includes both surveyed and excavated date. (42)

Marshall, Sydne B. (Columbia) THE PALEO-INDIAN COMPONENT SHAWNEE-MINISINK SITE, EASTERN PENNSYLVANIA. Discussion is made of analyses undertaken of Paleo-Indian lithic artifacts and ecofactual associations from the earliest cultural stratum at Shawnee-Minisink, a stratified, multicomponent site in eastern Pennsylvania yielding Paleo-Indian through Late Woodland components. The Paleo-Indian artifacts have been radiocarbon dated to $10,590 \pm 300$ B.P. (W-2994), $10,750 \pm 600$ B.P. (W-3134), and $9,310 \pm 1000$ B.P. (W-3388). Preliminary indications are that a limited range of activities were carried out at the site and that exploitation of locally available vegetal, riverine and lithic resources was a focal point for Paleo-Indian site occupancy. (35)

Maslowski, Robert F. (U.S. Army Corps of Engineers) MOOREHEAD CAVE CORDAGE ANALYSIS: ITS CULTURAL AND TECHNOLOGICAL IMPLICATIONS. Analysis of cordage specimens from Moorehead Cave, Val Verde County, Texas, resulted in the description of 10 types of cordage defined on the basis of fiber selection. Analysis indicated that twist patterns varied with fiber selection and manufacturing techniques. Attributes of utilitarian cordage did not change through time. The introduction of knotted netting and female aprons accompanied by new fiber processing and cordage manufacturing techniques resulted in changes in twist patterns. (11)

Masse, W. Bruce (Arizona) THE HOHOKAM OF THE SAN PEDRO VALLEY AND PAPAGUERIA: CONTINUITY AND VARIABILITY IN TWO REGIONAL POPULATIONS. The culture history and subsistence and settlement patterns of two regional Hohokam populations, the San Pedro Valley and the Papagueria, are briefly presented. Emphasis is placed on the variability within

and between these regions. The concepts of the Desert Branch Hohokam, Ootam and Dragoon cultures are reviewed, focusing on the problem of identifying the mechanisms (e.g., migration and trade) by which Hohokam cultural manifestations appear in these two regions. It is suggested that substantial changes in social or subsistence patterns occurred at least three times during the Hohokam cultural sequence. These are delineated and factors responsible for their inception are postulated. (8)

Matson, R. G. (British Columbia) LOCATIONAL DETERMINANTS OF CEDAR MESA CLIFF DWELLINGS. The locational model proposed is a linear, combinatorial one, based on the inverse of the distance to resources. It is compared to other methods of locational analysis, including catchment area studies. Locational factors accounting for Cedar Mesa cliff dwellings will be compared with those for the full sample of Pueblo II and III sites in this region, and with the sample of late Pueblo III sites only. In this way, the locational factors unique to the cliff dwellings can be examined, and the place of the cliff sites in the Pueblo III settlement system can be assessed. (30)

May, Ernest E. (see Canouts, V.) (35)

Mayer-Oakes, William J. (Texas Tech) BUREAUCRATS OR SCHOLARS—WHO CONTROLS ARCHAEOLOGICAL RESEARCH? Most archaeological research in the U.S. today is funded by Federal government agencies, as is most other scientific research. "Contract," or applied, archaeology is not always high quality and has elicited adverse publicity. Antiquities laws are being challenged. Some agencies request technical rather than professional services, foster mistrust by inter-regional contracting or consider cost alone. Costs have escalated and basic research declined as governmental regulation has increased. Archaeologists must counter these trends and, as citizen-scientists, make individual commitments to providing bureaucrats and the public with greater understanding of the need for well-managed, publicly funded research, both applied and basic. (20)

McAllister, Martin E. (U.S.D.A. Forest Service) THE NORTHEASTERN PERIPHERY OF THE HOHOKAM CORE AREA: BIG TIME EXCHANGE OR SMALL POTATOES? Hohokam sites of the Colonial and Sedentary Periods are known in the area bounded by the Mazatzal Mountains on the west, the Mogollon Rim on the north, Canyon Creek, the Upper Salt, and Pinal Creek on the east, and the middle Gila River on the south. A model is proposed that postulates a continuing relationship between the core area and the periphery. An hypothesis generated from this model will be tested using survey and excavation data from the area in question. Finally, the economic and socio-political implications deriving from the tests of the hypothesis are considered. (8)

McAllister, Shirley Powell (Arizona State) THE EFFECTS OF SEASONALITY ON SITE SPACE UTILIZATION. The proposal that a continuous relationship exists between the area a group occupies and the number of individuals in the group is questioned. It is suggested that the season of site occupation will affect the patterning of interior site space. Thirty-four Navajo sites of two known seasons of occupation and functions were mapped. Measures of interior and total site space from these sites are used to test the proposition that summer occupied sites will have proportionately and absolutely less interior space on them than will winter occupied sites. Implications of the findings for interpretation of the archaeological record are discussed. (22)

McAllister, Shirley Powell (see Rice, G. E.) (39)

McClung de Tapia, Emily (UNAM) PALEOETHNOBOTANICAL STUDIES IN MESOAMERICAN ARCHAEOLOGY. Paleoethnobotanical analysis was established as an integral part of archaeological investigation in Mesoamerica in the 1960's by Richard S. MacNeish but has not apparently progressed a great deal since then. Some of the problems faced by researchers in this area are considered, and some solutions proposed. Examples from recent paleoethnobotanical research carried out at Teotihuacán using data from excavations of René Millón's "Teotihuacán Mapping Project" are considered in relation to the problems as well as to the proposed solutions. (47)

McClurkan, Burney M. (see Snow, C.) (31)

McDonough, William (Massachusetts-Boston) LITHIC MATERIAL DEMAND AND QUARRY PRODUCTION. Quarrying is one way in which cultures dependent upon stone tools fulfill the demand for lithic materials. While quarry studies usually focus on aspects of supply and production, it is useful to examine demand itself, as well. Demand will vary with technology, among other factors, and will have implications for procurement strategies, frequency and duration of procurement episodes, transportation, etc. This paper will present a simple model for calculating

demand and will discuss the relevant variables. Ethnographic data from two stone tool-using cultures will be considered in light of this model. (33)

McGuire, Randall (see Kosakowsky, L.) (25)

McKinney, Charles M. (Heritage Conservation and Recreation Service) RECENT ANTIQUITY LEGISLATION INITIATIVES. The Department of the Interior has recently proposed new Uniform Rules and Regulations for the Antiquities Act. The background leading to this step, including a discussion of the impact of the Diaz decision, is reviewed, as are the proposed Uniform Rules and Regulations themselves. In addition, proposed transfer of authority on other legislation to the Department of the Interior is discussed, and the feasibility of Freedom of Information Act exemptions for all sites covered under the Antiquities Act is analyzed. (12)

McLandress, Robert (Allen and Associates) AN ARCHITECT'S VIEW OF THE MESA VERDE CLIFF DWELLINGS. A question that has long perplexed both archaeologists and visitors to Mesa Verde is why the Anasazi of this region abandoned their mesa top pueblos and built new villages in the cliffs during Pueblo III times. This paper proposes that the movement was caused by a combination of factors. The most important was that the microclimates of the selected rockshelters provided a more hospitable environment for the activities important at this time than did the climate of the open mesa top. (30)

McLaughlin, Diane E. (Arizona) A SHORT POLLEN CORE FROM NEAR THE LUBBOCK LAKE SITE, WEST TEXAS. Palynological information concerning the late Pleistocene environment of the Lubbock Lake site has been difficult to obtain. A short core was taken from a nearby location where it was believed that pollen would be better preserved. Geologic relationships of the core to the Lubbock Lake site are discussed. The pollen data may relate to a dry period, the Sharbauer Interval, at the Lake site. Some implications of these data for human occupation of the area from 10,000 to 11,000 years ago are suggested. (47)

McManamon, Francis P. (NPS) DISCOVERING NON-STRUCTURAL SITES IN THE EASTERN UNITED STATES: PAST AND FUTURE DIRECTIONS. Archaeological investigations for environmental impact statements and "Section 106" review, along with a growing interest in the reconstruction and analysis of settlement-subsistence systems, have influenced many archaeologists to consider explicitly the effectiveness of the techniques they are using to discover sites. The discovery technique(s) used in an investigation are one source of bias about which archaeologists must be concerned. Experiments and research comparing the effectiveness of different techniques, considering relative costs, field conditions, and/or expected site characteristics are rare. However, some of the work to date indicates that particular techniques will be more useful than others in certain situations. (13)

McMillan, R. Bruce (Illinois State Museum) ENVIRONMENT AND ARCHAEOLOGY IN SOUTHWESTERN MISSOURI. A few years ago plant geographers maintained that the biota of the Ozark Highland has remained relatively stable since the Tertiary, even during the periods of maximum glaciation. During the 1960's a long-term interdisciplinary program was initiated to test this assumption as well as to study the interaction of prehistoric man with the natural environment through time. This research indicates that there were dynamic changes in the Late Quaternary landscape and ecosystem and that these dynamics had a marked effect on the human inhabitants of that area. Discussion focuses on the history and aims of this program and serves as an introduction to the other papers in the symposium. (26)

McSwain, Rebecca (see Kosakowsky, L.) (25)

Mehringer, Peter J., Jr. (Washington State) THE STEENS MOUNTAIN PREHISTORY PROJECT. Through this project we hope to integrate the Holocene cultural and environmental history of an ecologically diverse and archaeologically rich region of southeastern Oregon. The archaeological data will come from both probabilistic sampling regime, with intensive and controlled surface collecting, and a multi-year excavation program. The paleoenvironmental base will be derived primarily from the study of algae, pollen, and macrofossils from mountain lake and desert spring sediment cores, and from analysis of plant and vertebrate fossils recovered from both archaeological and natural deposits. Detailed dating and identification of volcanic ashes will permit investigation of their ecological and cultural importance. (5)

Merbs, Charles F. (Arizona State) HUMAN BURIALS FROM CHAVEZ PASS, COCONINO NATIONAL FOREST, ARIZONA. During the summer of 1977, human skeletal remains representing over 50 individuals were recovered from the Chavez Pass Ruin, a late "Sinagua" pueblo complex located approximately 35 miles south of Winslow, Arizona, on the Coconino National Forest. The material was recovered from the surface and from backfill left by pothunters. Preservation

of the bones is excellent, especially where they were covered with backfill. This report will concentrate on biological aspects of the burials, including demography, cranial deformation, and pathology. Of special interest are examples of fused tarsals and metatarsals, fused vertebrae, cibra orbitalia, and dental pathology. (38)

Merbs, Charles F. (see Utermohle, C. J.) (38)

Miller, Russell L. (Missouri-Columbia) EURO-AMERICAN SETTLEMENT IN THE LOWER POMME DE TERRE VALLEY. The development of preliminary models pertaining to relationships between settlements and their natural environment is the first phase in an attempt to interpret cultural processes involved in the purchasing of land in the lower Pomme de Terre Valley. Regional settlement pattern studies are aided by ethnohistoric documentation, vegetational models, a form of "site-catchment" analysis, and a computerized mapping system. One may surmise that individuals were rationally selecting different catchment types in both spatial and temporal sequence that were related to cultural processes. Initial data have relevance in later analysis and construction of predictive models pertaining to historic site location. (26)

Mills, Barbara J. (Zuni Archaeological Enterprise) THE MILLER CANYON SURVEY: SETTLEMENT PATTERN IN THE ZUNI REGION. The results of archaeological survey in the Miller Canyon area of the southeast Zuni Indian Reservation are described. A comparison is made to other areas in the Zuni region that have been surveyed, and similarities in settlement pattern are noted. (45)

Mills, Barbara J. (see Dodge, W. A.) (45)

Mills, Barbara J. (see Ferguson, T. J.) (45)

Minor, Rick (Oregon) LATE PERIOD SETTLEMENT AT THE MOUTH OF THE COLUMBIA RIVER. A settlement pattern study is made of archaeological sites in the area at the mouth of the Columbia River. The effects of physiographic variables and differential access to anadromous fish on the nature and distribution of archaeological sites in this area are discussed. (11)

Mobley, Charles M. (SMU) DEMOGRAPHIC CHARACTERISTICS OF PECOS INDIANS: A MODEL BASED ON LIFE TABLES. Early excavations at Forked Lightning Ruin and Pecos Pueblo, New Mexico by A. V. Kidder produced large samples of human skeletal material dating from A. D. 1150 to the Historic Period. These data are considered to be valid for life table construction with some qualifications, and population demography statistics are generated for samples from seven periods of occupation. This allows examination of mortality, survivorship, probability of death, and life expectancy as it fluctuated from A.D. 1150 to 1700. Some general trends are indicated, including a degree of population stability during Glaze II, III, and IV periods. (45)

Mock, Donald R. (Florida-Gainesville) PROTON-INDUCED X-RAY EMISSION ANALYSIS OF FLORIDA-CHERTS. This paper summarizes the PIXE trace element analysis of materials utilized by the prehistoric people of Florida. In this relatively new and exciting technique, the samples are bombarded by protons of various energies and the x-rays characteristic of the trace elements present are observed by a Si(Li) detector. With this information, it should be possible to distinguish between Florida cherts and comparable materials from other locations in order to determine selection for quality and detection of imports. Ultimately, the study will make a basic contribution to the knowledge of primitive technology. (43)

Moholy-Nagy, Hattula (Zurich) THE USES OF MOLLUSKS AT TIKAL, GUATEMALA. Marine, freshwater, and land mollusks were used in various ways by the ancient inhabitants of Tikal. The emphasis of this paper will be on the sociocultural uses rather than on the mollusks themselves. Archaeological context, spatial and chronological distribution, manmade modifications, and natural occurrence all provide data indicating the ancient use of mollusks as status markers, food, raw material for artifacts, and ceremonial offerings (the Cult of the Sea), and as possible indicators of foreign influences. (3)

Montgomery, John L. (Texas Tech) AN APPROACH TO MAXIMIZING DATA RETRIEVAL IN CONTRACT SURVEY PROJECTS. Rigorous sampling designs are rarely integrated into contract funded survey projects. A federally funded survey project carried out in south Texas will be used as an example to demonstrate how a sampling design can be formulated and carried out. Such techniques as factor analysis and random sampling were used in the research design. Efficient and effective field techniques were employed to maximize the amount of comparable data retrieved from the field. The merits of such an approach will be discussed. (20)

Moore, James A. (Massachusetts-Amherst) WHAT YOU DON'T KNOW: HUNTER-GATHERER/AGRICULTURALIST INFORMATION FLOWS. The environment is a mosaic of natural and social

resources that groups exploit according to the information they have of resource location. The rate and kind of information flow can structure a groups' efficiency of environmental exploitation. With this understanding, this paper models the flow of information on hunter-gatherer/agricultural frontiers, and makes predictions for the behavior of these social systems. (2)

Moore, Josselyn F. (see Ford, R. I.) (22)

Moreau, Jean-Francois (Montreal) SOME PALEOECOLOGICAL CONSEQUENCES OF TWO VOLCANIC ERUPTIONS AS EVIDENCED BY THE MOLLUSCAN REMAINS OF A COSTA RICAN SHELL MIDDEN. Two grey stratigraphic layers recently discovered in a Costa Rican shell midden suggest the occurrence of two prehistoric volcanic eruptions. The analysis of absolute and relative frequencies of molluscan populations, as well as the study of the fluctuations of some metric attributes measured on these populations, suggest that these volcanic eruptions resulted in important changes in the ecological equilibrium of the intertidal zone of the Pacific coast of northwestern Costa Rica. (32)

Morenon, E. Pierre (North Texas State) NEW EVIDENCE FROM THE JORNADA BRANCH: EXCAVATIONS IN THE PLACITAS ARROYO. NTSU recently completed research for the SCS and the NPS on six archaeological sites in the Placitas Arroyo near the Rio Grande River, north of Las Cruces, New Mexico. Pithouses dating to 1,400 B.P., and various analyses, suggest non-traditional interpretations for the Jornada Branch of the Mogollon are proper. Sedentism occurs early. Horticulture is associated with local water resources irrespective of elevation. Cave deposits do not provide a good analogy for the occurrence of domesticates in open-air sites. Contemporaneous non-ceramic and ceramic sites indicate some re-assessment of the archaic-formative distinction is needed. (45)

Morris, Don P. (Arizona Archeological Center) SIGNIFICANCE OF CLIFF DWELLINGS IN CANYON DEL MUERTO, ARIZONA. Recent excavations at Antelope House and survey information from related cliff dwellings in Canyon del Muerto, Arizona, demonstrates that perishable materials from those sites provides unexcelled data for: (1) environmental base line studies; (2) direct weather and climatic effects on crop products; (3) processing and manufacturing techniques, among others. Sites containing these data are rare; their excavation should be approached systematically and carefully. Much material from the excavation will be unique and will require refined methods of collection, analytical management, and curation to yield as much information as possible. (30)

Morris, Donald H. (see Merbs, C. F.) (38)

Morse, Dan (Florida State) CASE REPORTS. There are many more skeletons found on the surface than buried. When these cases are investigated, in order to best "recreate the event," care and accuracy are required. For illustration, the cases of three skeletons discovered recently in Florida are discussed. The most probable cause of death in the first case was natural, in the second, suicide, and in the third, murder. In all cases, archaeological techniques were applied and resulted in the recovery of significant information for the investigation of each case. (31)

Moseley, Michael E. (see Kus, J. S.) (17)

Mountjoy, Joseph B. (North Carolina-Greensboro) RESEARCHING THE PREHISTORY OF THE TOMATLÁN RIVER VALLEY, 1975-1977. From 1975 through 1977 research has been conducted in the Tomatlán river valley of coastal Jalisco Mexico in order to recover information regarding prehispanic occupation before sites were destroyed by the Cajón de Peña dam and Irrigation project. Some 50 kilometers of the river valley were investigated and 165 sites recorded. The sites were mapped and sampled, and excavations conducted at six of them. The occupation of the valley from at least 200 B.C. to A.D. 1579 is traced through four distinctive periods of development which reveal some of the processes involved in the evolution of a coastal valley cultural system. (40)

Myers, Thomas P. (University of Nebraska State Museum) THE FRINGES OF THE INCA EMPIRE. While ecological boundaries contribute to a non-circular pattern of culture traits, political influences, etc., human ecology rather than natural ecology is the critical variable. The expansion of empire is founded upon the conquest of sedentary peoples who are bound in place by capital investments in the modes of production. It follows that: (1) incorporation of developed areas is the primary objective of empire expansion; (2) underdeveloped areas will surround the empire; (3) underdeveloped regions within the empire were incorporated for strategic purposes. These hypotheses are tested against data from the northern and eastern edges of the Inca Empire, an extreme example of linear configuration. (23)

Neely, James A. (Texas-Austin) THE ARCHAEOLOGY OF THE WS RANCH SITE, WEST CENTRAL NEW MEXICO: THE 1977 SEASON. An intensive surface survey of the WS Ranch site indicated its potential as a regional trade center and as a major occupation locus in the transition zone between the Pinelawn-Reserve and Mimbres Branches of the Mogollon. Test excavations were initiated to evaluate these potentials at this large, apparently badly looted site. The archaeological findings at this multicomponent site, occupied from about A.D. 800-1250, are reported in this paper. A statement of objectives for continued excavations at the WS Ranch site and a regional survey of the surrounding San Francisco River Valley and its tributaries will be presented. (45)

Neely, James A. (see Turpin, S. A.) (45)

Neily, Robert B. (SIU-Carbondale) COMMUNITY ADAPTATION AND CHANGE ON BLACK MESA. A theoretical and methodological base is presented from which spatially distinct contemporaneous sites may be grouped into interacting communities. The nature and extent of a community's exchange spheres are seen as major factors in its capability to remain stable or, alternatively, to adjust to external change factors. It is from this perspective that adaptation and change on Black Mesa is examined. (22)

Nelson, Ben A. (SIU-Carbondale) THE PROBLEM OF HYPOCOHERENCE IN SYSTEMIC REORGANIZATIONS PRECEDING THE NORTHERN BLACK MESA ABANDONMENT. The rapid but orderly abandonment of an aboriginally occupied area implies prior stress of some form on or within the cultural system. Given this proposition, the archaeological record should therefore bear evidence of adaptive shifts in the period preceding the ca. A.D. 1150 abandonment of large portions of Black Mesa. Such shifts would be reflective of the creation of additional buffering mechanisms to enhance the survival probability of the system. Evidence relating to this hypothesis is reviewed. It is argued that Rappaport's notion of hypocoherence may be valuable in explaining the failure of the hypothesized systemic reorganizations, and consequently, useful for interpreting the northern Black Mesa abandonment as an example of systemic maladaptation. (22)

Netherly, Patricia J. (SUNY-Fredonia) ARCHAEOLOGICAL IMPLICATIONS OF SOCIAL ORGANIZATION ON THE NORTH COAST OF PERU. The basic structure of the social organization of North Coast societies of the Late Intermediate and Late Horizon periods has been described. Moiety division is found to have been a fundamental organizational principle that was expressed in sociopolitical units at all levels. Examples of the manifestation of this duality in the material culture of the North Coast are presented using ceramic styles from Lambayeque and the settlement pattern associated with specific sites in the Chicama valley. The hierarchical implications of these expressions of duality are discussed. (9)

Neuman, Robert W. (see Byrd, K. M.) (46)

O'Grady, Patricia D. (see Karwedsky, R. A.) (46)

Ohel, Milla Y. (Cincinnati) CONDITIONS FOR ESTABLISHING DELIBERATE MODIFICATION OF LITHIC SPECIMENS. Traditional criteria for the recognition of human-made stone artifacts, based upon certain physical characteristics on flakes, can hardly ascertain the validity of deliberate, human modification in questionable cases. It is suggested here that a system of direct and/or circumstantial conditions, based on archaeological theory and practice, be substituted for these criteria. Clactonian occurrences in Britain serve as an example for the application of the suggested procedure. (44)

Okladnikov, Alexei Pavlovich (see Ackerman, R. E.) (44)

Olsen, Marion G. (Wisconsin-Milwaukee) SURFACE INVESTIGATION OF THE MACHALILLA COMPONENT AT REAL ALTO, ECUADOR. Slides showing the first evidences of an angular Machalilla structure (ca. 1350 B.C.) and associated ceramics will be presented. Possible affiliations with other Machalillan and Valdivian components will be discussed. These investigations are a result of survey and testing that was conducted in 1977 at the site of Real Alto and the surrounding area, and is part of an ongoing survey and excavation which will be continued in 1978. (17)

Olsen, Sandra L. (California-Berkeley) MICRO-WEAR ANALYSIS OF UTILIZED BONE FROM GRASSHOPPER RUIN, ARIZONA. This study attempts to distinguish wear patterns on bone implements which occur during manufacture from those that are introduced through use. Microscopic analysis and replication experiments were performed, in addition to ethnographic research into the functions of certain tool types. Through the decades, southwestern archae-

ologists have coined numerous terms of bone implements, which usually imply specific functions. The research on the utilized bone from Grasshopper Ruin is directed toward the goal of determining the range of functions applicable to each tool type and constructing a more accurate classification of southwestern bone artifacts. (38)

Olsen, Stanley J. (Arizona) SPECIAL PROBLEMS OF FAUNAL ANALYSIS IN THE MAYA AREA. Faunal analysis of sites within the Maya area pose problems not usually encountered elsewhere in the hemisphere. There are extreme differences in elevation, climate, and ecological conditions within a comparatively restricted geographical area. The vertebrates are of mixed Nearctic and Neotropical origin. The avifauna is rather extensive due to the migratory flyway of the Central American corridor. Humid soil conditions and the close proximity of some of the larger Maya sites to large watercourses contribute to a considerable loss of bone material. These and other problems that confront the zooarchaeologist are discussed. (3)

Olson, Gerald W. (Cornell) SOME PEDOLOGICAL OBSERVATIONS OF SOILS IN MAYA AREAS IN RELATION TO ARCHAEOLOGY. Soil characteristics which influenced and were modified by Maya populations are emphasized in this paper, with examples from fieldwork at locations including Tikal (in Peten Region, Guatemala), San Antonio (on Rio Hondo, Belize), and Valle de Naco (near San Pedro Sula, Honduras). Soils at each site were major resources that enabled initial development of increasingly complex settlements; growth of social organizations required considerable modifications of the soils; finally the technology of the time proved limiting to sustain the yields required from the soils to support the large populations. Pedological evidences of erosion, sedimentation, disturbance, depletion, and enrichment contribute significantly toward understanding of past events at each Maya site. (10)

Olson, L. (see Tuggle, H. D.) (14)

Olszewski, Deborah I. (Arizona State Museum) MEMOIRS OF A MIDDEN. Preliminary results from the excavation of Arizona Public Service site CS-49, a small pueblo in Central Arizona, are presented. Emphasis is placed on materials recovered from the midden area. Indications are that primary cultural behavior occurred in this area in addition to refuse deposition. Detailed technological analysis of lithics aided in determining the plausibility of such activity. Furthermore, the presence of cultural features supports the premise of primary activity within the midden. It is therefore suggested that more emphasis be placed on nonarchitectural features within habitation sites. (19)

Padgett, Thomas J. (Arkansas) PROBLEMS AND PROMISE OF THE SMALL-SCALE ARCHAEOLOGICAL SURVEY—THE DEBATE IN THE SOUTHEAST. Small-scale archaeological surveys have inherent limitations that may restrict the usefulness of the data obtained. In the southeast, various attempts have been made to construct regional or state wide research designs to guide survey methodology and to provide interpretive frameworks for site survey data. Some of these attempts have been characterized as "pseudo-science" by other workers in the area. Although certain criticisms are justified, the potential for small scale surveys to generate data relevant to regional problems should not be dismissed. The integration of site data is essential for the formulation and revision of productive research designs. (39)

Pailles, Richard A. (Oklahoma) THE UPPER RÍO SONORA VALLEY IN PREHISTORIC TRADE. Results of recent archaeological research in upper Río Sonora valley are discussed, presenting data on local settlement-subsistence patterns, non-subsistence agriculture and related activities, community architecture, including the presence of possible ball courts, and the existence of a ranked society in northeastern Sonora in later prehistoric times. A network of external trade, dominated by economic relations with Casas Grandes, is postulated. (37)

Paradis, Louise I. (Montreal) THE POLITICAL STATUS OF THE TIERRA CALIENTE OF GUERRERO, MEXICO: 1500 B.C.—A.D. 1500. The *Tierra Caliente* of Guerrero, Mexico, situated in the southwestern corner of Mesoamerica, is in an isolated geographical setting in relation to the rest of the cultural area. Archaeological and ethnohistorical research has confirmed a long sequence of human occupation in the region. An attempt is made to evaluate the political status of the *Tierra Caliente* throughout its history, to investigate the nature of the political relationships with other areas of Mesoamerica and to weigh the various factors responsible for them. (40)

Paynter, Robert W. (Massachusetts-Amherst) SPATIAL RESPONSES TO LONG DISTANCE PROCESSES: MODELS AND ASSUMPTIONS. This paper contributes to studying long distance interactions through the analysis of settlement patterns. The responses of settlement patterns have generally been models developed by regional economists and geographers. The limits to the use of models such as Central Place and Thunen landscapes are considered, particularly

with regard to their marginalist assumptions. This critique results in some positive suggestions for the space economy response in both capitalist and pre-capitalist stratified systems. (2)

Pearson, Charles E. (Georgia) PREHISTORIC SETTLEMENT CHANGE ON THE GEORGIA COAST. The changes in the structure of prehistoric settlement systems through time are considered reflective of changes in a range of socio-cultural factors. Settlement data from two Mississippian period phases (Savannah phase, A.D. 1150-1350, and Irene phase, A.D. 1350-1550) on the Georgia coast are examined in an effort to characterize and assess adaptive differences and similarities between the two phases. (46)

Peebles, Christopher S. (Michigan) THE RIVER RAISIN ARCHAEOLOGICAL SURVEY, MICHIGAN. During the last three years, an 8.5% stratified-random sample of an 1129 mi² watershed in southeastern Michigan has been completed. This survey, in addition to interviewing collectors and amateur archaeologists and documenting their private collections (400+), has conducted a fine-scale reconnaissance of over 100 square miles. The resultant data-yield measures of site density, variety, and distribution, as well as quantitative measures of site destruction. Approaches to and results of the survey are discussed, with special attention paid to the development of quantitative measures of site destruction. (12)

Perlman, Stephen M. (South Carolina) THE EFFECT OF COASTAL PROCESSES ON COASTAL AND INLAND SETTLEMENT. Studies of coastal adaptation usually consider one phenomenon: sea level rise. This focus is often a methodology for assessing the representativity of coastal settlement patterns through an analysis of the transgressions and regressions of coastal waters. Coastal processes are more complex and can be used in a more dynamic manner than this application suggests; and their implications generate consequences for both inland and coastal settlement. (2)

Pettigrew, Richard M. (Oregon) THE PREHISTORIC CHEWAUCANIANS: LAKE DWELLERS OF LAKE ABERT, SOUTHEASTERN OREGON. The discovery of a dense cluster of pithouse villages along the shores of Lake Abert, in southeastern Oregon, is reported. Evidence gathered in survey and test excavations strongly suggests that Lake Abert was the center of a lacustrine and marsh-oriented society approximately 4,000 to 1,000 years ago when increased precipitation made the lake and its drainage basin more biotically productive than today. This Chewaucanian Culture shows adaptive similarities, and perhaps affiliations, with the lacustrine and marsh-oriented Klamath and Modoc of the contact period. The significance of the Lake Abert discovery to the prehistory of the Northern Great Basin is discussed. (11)

Pilles, Peter J., Jr. (USDA Forest Service) COLONIES, TRADERS, AND TRAITS: THE HOHOKAM IN THE NORTH. Many writers have commented on the appearance of a complex of Hohokam traits in the Verde Valley and Flagstaff areas during the period A.D. 700-1100. Traditionally, this has been viewed as an organized movement of Hohokam families whose presence triggered significant changes in local cultural developments. This paper reviews existing data and questions the traditional interpretations. Other hypotheses focusing on demography and trade are offered to explain the phenomenon. Additional archaeological data needed to test these hypotheses are identified. (8)

Pitcher, Brian L. (see Hamblin, R. L.) (27)

Plog, Fred (Arizona State) THE NATURE OF HOHOKAM CULTURAL CHANGE. Significant aspects of Hohokam settlement size and diversity are poorly described in the existing literature. Evidence placing a greater emphasis on settlement diversity as well as that of artifactual materials decreases the magnitude of change that occurred as Hohokam evolved. A continuity of evolutionary developments from pre-Hohokam Desert Culture populations in southern Arizona through the Hohokam Classic is suggested. Parallels between Hohokam cultural changes and contemporaneous changes in other parts of the southwest are identified. (1)

Plog, Stephen (see Hantman, J.) (22)

Pohl, John M. D. (see Smith, J. W.) (11)

Pohl, Mary (Florida State) FAUNA AS AN INDICATOR OF DIFFERENTIAL SOCIAL STATUS AMONG THE ANCIENT MAYA. An analysis of vertebrate faunal remains from five sites in Peten, Guatemala, reveals changing patterns of resource procurement from the Preclassic through the Postclassic Periods. This paper focuses on game as a status commodity. The effects of elite demands on the selection and distribution of meat are examined. (3)

Pollard, Helen P. (SUNY-Plattsburgh) A RESEARCH DESIGN FOR THE STUDY OF THE PROTOHISTORIC TARASCAN POLITICAL SYSTEM. This paper puts forward the rationale for the

research design of a project concerning the Protohistoric Tarascan political system. It shows how the use of models constructed from data in the modern and early historical periods and the awareness of the trajectory of culture change provided by the sequence of these models enables the authors to use available ethnohistoric and archaeological data for the protohistoric period economically and efficiently. (40)

Powers, Margaret (Museum of Northern Arizona) VARIABILITY IN PUEBLO BUILDING STRATEGIES IN THE CEDAR MESA REGION, UTAH. Architectural patterns at class dwellings in the Grand Gulch-Cedar Mesa Region of SE Utah are analyzed. Archaeological and dendrochronological data are used to evaluate the contention that different physical settings call forth different construction strategies among Pueblo builders. Characteristics of building form and wood usage are seen to vary with different kinds of available building space. (30)

Powers, Margaret A. (see Fryman, J. W.) (48)

Pozorski, Sheila G. (see Kus, J. S.) (17)

Pozorski, Thomas G. (see Kus, J. S.) (17)

Precourt, Prudence S. (Wisconsin-Milwaukee) SITE SURVEY TECHNIQUES AND SUBREGIONAL SETTLEMENT PATTERNS: THE PUEBLA VALLEY. This brief report will review the field techniques utilized by the Puebla Preclassic Project site survey crew in the completion of the intensive, controlled surface reconnaissance of the Puebla Valley. This includes the basic methods of site location, mapping, and artifact collection as well as sampling techniques and the rationale behind them. Several problems encountered in the conduct of the survey will be discussed along with their effects on the interpretation of the data. The pattern of site distributions derived from this data is considered. The deviations from the general model of Central Mexico Highland settlement which this example demonstrates are also described. (40)

Precourt, Prudence S. (see Fowler, M. L.) (40)

Price-Beggerly, Patricia (Hawaii) PRE-AGRICULTURAL HAWAII—A POSSIBLE MODEL. This model deals with the cultural adaptation an initial settlement group would need to make to guarantee their survival in an unknown Hawaiian environment. It suggests that the colonizers did not choose the environments which were later extensively and intensively manipulated but rather chose more diversified areas which allowed a greater range of natural flora and fauna to be exploited. It further suggests that early Hawaiians did not rely primarily on marine resources until horticultural self-sufficiency was achieved but rather also exploited in significant proportions both bird and native vegetable products. (14)

Purdue, James R. (Illinois State Museum) ENVIRONMENTAL IMPLICATIONS DERIVED FROM THE RODGERS SHELTER VERTEBRATE FAUNA. Vertebrate skeletal remains can potentially provide evidence of prehistoric climatic change. Traditionally, studies of this sort have emphasized the presence or absence of environmentally sensitive species. In addition to this kind of analysis of the Rodgers fauna, a multivariate statistical study of subtle changes in bone morphology through time was instigated. Modern skeletal squirrel (*Sciurus carolinensis* and *S. niger*) specimens were collected from eastern Tennessee to western Kansas, i.e. mesic to xeric habitats. Clinal variation was found for both species. Morphological changes in squirrels from Rodgers from pre-hypsithermal to hypsithermal times, i.e. mesic to xeric regimes, corresponded in direction to that discovered for modern squirrels. (26)

Purdy, Barbara A. (Florida State Museum) CONTRIBUTIONS OF QUARRY STUDIES TO ARCHAEOLOGICAL INTERPRETATION. The paper summarizes observations made at chert outcrop/workshop sites in Florida and speculates about possible universal stone procurement practices. It is suggested that variations in procurement techniques may serve as time and space markers in much the same way that changes in debitage or stone tool typology are used as index fossils. (33)

Purdy, Barbara A. (see Mock, D. R.) (43)

Rafferty, Janet E. (Mississippi State) FUNCTIONAL ANALYSIS OF SURFACE COLLECTIONS, TOMBIGBEE RIVER, MISSISSIPPI. The potential of surface material collected during intensive survey of an area is often overlooked. Functional analysis of surface collections from sites along the Tombigbee River in Mississippi indicates that such collections can serve as an important source of evidence on settlement patterns and changes occurring through time and space. Hypotheses about the nature of such changes are partially tested using this data. (46)

Rands, Robert L. (SIU-Carbondale) PATTERNS OF CERAMIC EXCHANGE IN THE PALENQUE REGION, MEXICO. Ceramic exchange in the region of the Maya site of Palenque is indicated by technostylistic analysis. Relationships of form and functional attributes to technological data suggest the existence of sites or localities specializing in the production of different ceramic classes. Among these was Palenque—the site and its immediate vicinity—and recognition of its locally produced ceramics is critical in reconstructing intra-regional trade. Data are examined in accordance with a central place-satellite model, in which varying patterns of ceramic exchange operated on different levels of sociocultural complexity. Specific examples illustrate integrative aspects of Palenque's system of ceramic trade. (21)

Rasson, Judith A. (SUNY-Binghamton) INTERACTION SPHERES AS ADAPTIVE MECHANISMS. Interaction spheres may be interpreted as adaptive mechanisms maintained by the flow of information and goods between populations using shared stylistic elements to communicate commonality of interest. Interaction spheres thus represent channels of communication for exploitation in times of social or economic stress. (44)

Rattray, Evelyn C. (see Krotser, P. H.) (21)

Reeves, Brian O. K. (see Smith, J. W.) (11)

Reid, J. Jefferson (Arizona) TO SOOTHE THE SALVAGE BEAST. Research, budgets, logistics, and all that we hold dear in conservation archaeology are a matter of impacts. Emphasized in this regard is the crucial relationship between valid research and clear understanding of the range of impacts to cultural resources. A classification of impacts is presented, impact identification procedures and problems are discussed, and avenues of investigation to increase our identification and predictive abilities are suggested. A consistent, coherent approach to impacts must prevail if conservation archaeology is to overcome a salvage past. (12)

Reidhead, Van A. (Missouri-St. Louis) SIMULATING OPTIMAL RESOURCE USE IN SUBSISTENCE CHANGE. This paper examines linear programming as a technique for simulating optimal resource use strategies under conditions of change. Using a nutritional model and substantive data from the Midwest, the paper examines the archaeological application of linear programming at a number of levels including: (1) the value of the technique in explaining changes in resource use patterns, (2) its use in analyzing the impact of alternate subsistence strategies, and (3) practical aspects of employing the method. (36)

Reitz, Elizabeth J. (Florida State Museum) ANALYSIS OF FAUNAL REMAINS FROM ST. AUGUSTINE, FLORIDA. St. Augustine, located on Florida's northeast coast, was founded by the Spanish in 1565 as a military garrison. The Spanish followed a subsistence strategy incorporating both domestic and wild resources in their diet. The faunal remains are analyzed in order to understand the Spanish adaptation to their coastal environment and the use made of the domestic animal resources. (46)

Reyman, Jonathan E. (Illinois State) THE PREDICTIVE DIMENSION OF PRIESTLY POWER. Pueblo priests used esoteric knowledge to predict seasonal changes and astronomical events, and their power increased or diminished with their ability to "control" such phenomena. Inaccurate predictions often resulted in discord and possibly in charges of witchcraft. The use of this ethnographic/ethnohistoric model for studying prehistoric Anasazi sites is discussed, especially with reference to Mexican origins for the Pueblo complexes. (37)

Rice, Don S. (see Deevey, E. S.) (10)

Rice, Glen E. (Arizona State) THE INCORPORATION OF SMALL CONTRACT PROJECTS INTO A REGIONAL SAMPLING DESIGN. The question of integration of small archaeological contract surveys into a regional research design is considered. Using an overall project universe of the greater Phoenix area, small projects done by Arizona State University will be examined to determine the nature of project locational bias. While areas encompassed by small clearance projects vary considerably in shape, size, and distribution, it is argued that they must be treated as sampling units within a regional universe if the data they produce are to be useful. Since small clearance surveys will seldom approximate statistically valid samples of a region, guidelines for evaluating the extent and direction of the biases in such uncontrolled samples are suggested. (39)

Rice, Glen (see Upham, S.) (1)

Rice, Prudence M. (Florida) POSTCLASSIC POTTERY PRODUCTION AND EXCHANGE IN THE CENTRAL PETEN, GUATEMALA. Postclassic pottery from the Central Peten, Guatemala, shows some degree of stylistic homogeneity, but variability in pastes suggests a number of manufac-

turing centers within this region. The distribution of these paste categories at Maya Postclassic sites in Peten is revealing in terms of the nature of intraregional contacts and exchange. (21)

Riley, Carroll L. (SIU-Carbondale) THE IMPACT OF MESOAMERICAN INTERACTION ON HOHOKAM CULTURE CHANGE. This paper examines the problems of Hohokam-Mesoamerican contacts from the vantage point of the early 16th century. Utilizing both ethnohistorical and archaeological data, I survey the socio-political and economic organization of indigenous groups, and the nature of Mesoamerican contacts both in the traditional Hohokam area and—more importantly—in such nearby regions as the northern portions of the Sierra Madre Occidental and the adjacent Sonoran lowlands. These data, combined with archaeological interpretations from the Hohokam proper and from pre-Spanish west Mexico provide new insights into the nature of Mesoamerican interaction with the Hohokam. (1)

Riley, Thomas J. (Illinois-Urbana) THE PEOPLING OF HAWAII. Models of the development of the chiefdom in Hawaii have been proposed, with increasing population pressure an implied but unstated influence. This paper is an attempt to trace several possible population trajectories for the Hawaiian Islands, and to try to fit one or more of these models to the known archaeological data and to the Hawaiian population estimates offered by the early European explorers. (14)

Robertson, Patricia Crown (Arizona) SOUTHWESTERN CERAMIC CLASSIFICATION: NEW INSIGHTS FROM THE CHODISTAAS SITE. Archaeological investigations at the Chodistaas site (AzP:14:24) in east-central Arizona have revealed a 20 room pueblo with an occupation span of 15 to 25 years based on tree-ring and ceramic dating. The five rooms excavated have produced 183 reconstructable vessels from the apparently unscavenged floors of the burned pueblo. These vessels include a number of standard types whose occurrence at the site may raise significant chronological questions. The collection displays stylistic uniformity among the types present. Interesting relationships have emerged through comparison of household inventories of vessel numbers, forms, and types. (38)

Rogers, R. (see Hay, C. A.) (27)

Roggie, A. E. (Bureau of Reclamation) SPATIAL ANALYSIS OF SURFACE SHERD AND LITHIC SCATTERS. The ever-increasing number of intensive cultural resource management surveys in the American Southwest has led to the discovery of more and more ostensibly nondescript surface sherd and lithic scatter sites. New analytical strategies must continue to be developed to glean more of the information potential embodied by these types of low-density archaeological resources. This report explores the usefulness of dimensional analysis of variance for documenting the spatial structure of a sherd and lithic scatter located adjacent to the Salt River in central Arizona. Problems encountered are described and potential solutions and alternative analytical approaches are discussed. (15)

Rohn, Arthur (Wichita State) HISTORY AND POTENTIAL OF STUDIES OF THE SOUTHWESTERN CLIFF DWELLINGS. A review of early cliff dwelling studies and a discussion of their contribution to the development of southwestern archaeology in general and to some current research emphases in particular. (30)

Romero, Angeles (see Josserand, J. K.) (49)

Root, Dolores (Massachusetts-Amherst) HUNTER-GATHERER SOCIAL ORGANIZATION AND UTILIZATION OF VARYING ENVIRONMENTS. Often archaeological settlement pattern models focus on pattern rather than variability. Thus, modal patterns of hunter-gatherer social organization and utilization of a landscape are generated. It is argued that social organization reflects the expense or efficiency of resource procurement depending on the patch structure of resources in space and/or time. The Tlingit's and the Kutchin's utilization of a predictable and clustered resource, migratory fish, is examined and contrasted in terms of the variation in abundance, availability, and predictability. Social organization reflects and amplifies the magnitude of resource fluctuations in an environment. Archaeological implications are considered. (47)

Root, Dolores (see Gero, J. M.) (13)

Roper, Donna C. (Missouri-Columbia) SETTLEMENT-SUBSISTENCE SYSTEMS IN THE TRUMAN RESERVOIR AREA. Recent intensive survey and excavation has documented the same 10,500-year span of occupation throughout the Truman Reservoir as is seen at Rodgers Shelter—i.e., Plainview through Late Woodland and Central Plains-like manifestations. This paper briefly considers regional trends in spatial distributions of recognizable and identified components.

The analysis is set within the framework of a behavioral model of human interaction with the natural environment and documents the statics and dynamics of settlement pattern changes in the central Osage River Basin. (26)

Rose, Martin R. (Arizona) THE EXTENSION AND QUANTITATIVE RETRODCTION OF INTRANNUAL PALEOCLIMATIC VARIABILITY ON THE COLORADO PLATEAU: A TEST CASE. The feasibility of reconstructing paleoclimatic variables such as precipitation, temperature, and the P.D.S.I. (an integrative hydrologic accounting measure) is demonstrated by current dendroclimatic research. Calibration, verification, and retrodction procedures, and the concepts of response and transfer functions are elaborated. The necessity for numerically modeling time series of merged archaeological and recent tree-ring indices during years of common overlap is indicated as: in the time domain with autoregressive (AR), moving average (MA), or mixed ARMA equations, and in the frequency domain with power (variance) spectrum techniques. The potential for such reconstructions is illustrated with an example from Arroyo Hondo and Santa Fe, New Mexico. (47)

Rosenberg, Bettina H. (Salt River Project) ELECTRICITY GENERATES ARCHAEOLOGY: A UTILITY'S ROLE IN CONTRACT ARCHAEOLOGY. The construction of a coal-fired generating station in St. Johns, Arizona and its associated features, created the need for intensive archaeological investigations. Salt River Project, a water and power utility in Arizona, contracted with the Museum of Northern Arizona for all of the Coronado Project related studies. Based on federal and state antiquities requirements, and SRP's own archaeological resources policy, reconnaissance and intensive surveys and mitigation procedures were undertaken for all aspects of the project. Sites identified which could not be avoided were excavated at the plant and evaporation pond (six sections of land), 100 miles of transmission lines, a 45-mile railroad, wellfields, and a water pipeline. (42)

Rosendahl, Paul (Bishop Museum) THE IMPACT OF EARLY HAWAIIANS ON THEIR ISLAND ENVIRONMENT. The thesis to be considered is that the impacts upon and modifications of the island environment by the early Hawaiians differed quantitatively, and not qualitatively, from modern impacts and modifications, and that the relatively smaller scale modifications effected by the early Hawaiians were not for want of trying but were limited by available technology and social organization. This thesis is developed in greater detail, and the archaeological and other relevant evidence for early Hawaiian impact on their island environment is examined and evaluated. (14)

Rosenthal, E. Jane (Arizona) REGIONAL SHELL EXCHANGE IN THE ARIZONA PAPAGUERIA. Hohokam shell trade processes are explored emphasizing sources, destinations, and exchange methods. Historic and ethnographic data is reviewed to determine traditional trading patterns and establish a series of hypotheses for investigation. Shell bracelets, rings, and manufacturing debris distributions at recently excavated sites in south central Arizona are analyzed to test two alternate models. A shift in shell trading mechanisms is postulated from centralized long-distance expeditions in the Sedentary period to reciprocal exchange or tribute systems in the Classic period. (38)

Rothschild, Nan (CUNY-Hunter) THE ONDERDONK SITE: AN HISTORICAL CONTINUUM. An early 18th century Dutch House in Queens, N.Y., shows a variety of occupations that reflect changing patterns of land use in its immediate environment. These range from farming to space age rocket technology, all of which are reflected in the archaeological record. The site also demonstrates the value of excavation in a highly disturbed setting, and has an interesting role as a focal point for community organization. (35)

Rozen, Kenneth C. (see Dickerson, J. L.) (19)

Rubertone, Patricia E. (SUNY-Binghamton) AN ARCHAEOLOGICAL APPROACH TO COMPLEX SOCIETIES USING MEASURES OF CERAMIC VARIABILITY. Ways of measuring and describing forms of social organization in complex archaeological sites are discussed. Previous studies of ceramic variability and social organization have not fully examined the various kinds of information contained in these materials, nor have they presented adequate interpretive models to relate ceramic variability to organization in a complex society. Analytical strategies presented involve looking at different kinds of information in ceramic attribute data and using these measures as evidence of different kinds of interaction networks in the community. (6)

Rudecoff, Christine A. (see Findlow, F. J.) (33)

Salwen, Bert (NYU) ARCHAEOLOGY IN MEGALOPOLIS: UPDATED EDITION. Because of the "disturbed" nature of the terrain, archaeologists working in built-up "urban" situations frequently underestimate the possibilities for the survival of useful archaeological information.

Recent experience, most of it in connection with federally-mandated historic resource surveys, has demonstrated that such disturbances are often quite superficial, and that important sites and features may exist, intact, beneath them. In fact, since all human activity "disturbs" the locale in which it occurs, the evidence of past construction and destruction may be the very resource that gives the area its historical and cultural importance. This paper presents examples of successful recovery of archaeological data in urban contexts in the northeastern United States, and discusses some special emphases and methodologies that are appropriate in these situations. (7)

Salwen, Bert (see Rothschild, N.) (35)

Sanabria, Laura (see Dickson, D. B.) (27)

Sanders, Lois E. (Oklahoma) PHYSICAL AND CULTURAL VARIABLES AFFECTING PHOSPHATE DEPOSITION AND PRESERVATION AT ARCHAEOLOGICAL SITES. Physical and cultural variables involved in the deposition and preservation of organic phosphate-containing debris at archaeological sites are discussed. The physical factors include soil pH and clay or mineral content of the soil. Cultural variables include the type of site, the spatial arrangement of activity areas within the site, and cultural values. These variables are briefly discussed for the temporally or seasonally occupied site, 34-Pw-63. (46)

Sappington, Robert Lee (Idaho-Moscow) THE LYDLE GULCH SITE, SHOSHONEAN ADAPTATIONS, AND NORTHERN GREAT BASIN PREHISTORY. A small concentrated open site was excavated in the Boise River canyon during summer 1977. Two components are present at Lydle Gulch (10AA72), the upper one with Late Period obsidian tools and debitage, bone tools, and "Shoshonean" fingernail-impressed pottery. The lower component, apparently 3,000 years old, includes points comparable to Great Basin Archaic forms. The site is particularly important for its excellent preservation of food remains—mussel shells; hackberry seeds; deer, rodent, bird, and fish bones. Analysis of 10AA72 provides data complementary to previous information about Northern Great Basin adaptations from cave and rockshelter sites. (11)

Satsanguan, Ngampit (Missouri-Columbia) PLAINVILLE IN TRANSITION. In the last century and a half, Plainville has passed through five critical periods. The first two (1830-1865 and 1865-1900) can be described as closed, isolated, and self-sufficient. During the third and fourth (1900-1940 and 1940-1955), Plainville underwent significant sociocultural changes. Modern technology, increasing control by federal government and the process of "urbanization" were all external forces contributing to opening Plainville to the outside world. During the fifth period (1955-1977), which is most crucial, Plainville can be best described as a "retirement community" threatened by the culture and values of "foreigners." (26)

Saul, Frank P. (Medical College of Ohio) MAYA SOCIOCULTURE AND ECOLOGY AS RECORDED IN THEIR SKELETONS. The skeletal remains of the Maya themselves, provide many opportunities for the direct and indirect examination of the sociocultural and ecological concerns of these twin Symposia. Data derived from our intensive studies of the inhabitants of Altar de Sacrificios (Guatemala), Seibal (Guatemala) and Tancah, Mexico and Cuello (Belize) and our survey of other Maya populations (especially Chichén Itzá, Mexico) will demonstrate the importance of studying such seemingly unrelated esoterica as linear enamel hypoplasia, ossified subperiosteal hemorrhages, spongy/porotic hyperostosis, femur length, Carabelli's Cusp, etc. The time span involved ranges from the earliest Maya of 2600 B.C. to the present. (3)

Saul, Julie Mather (see Saul, F. P.) (3)

Savage, Howard (Royal Ontario Museum) FAUNAL FINDINGS IN CAVE SITES IN BELIZE. Lime-stone cave sites in Belize, in use during the Late Classic Period mainly for ceremonial purposes, show considerable faunal material. Numerous faunal artifacts probably had a ritual use. Drilled dog teeth are particularly numerous at Actum Pobilche. Food items, e.g. deer, brocket, paca, tapir, bobwhite, guan and gallinule, are relatively uncommon. Remains from cave-dwelling fauna are abundant. (3)

Schacht, Robert M. (Wayne State) THE DEVELOPMENT OF IMPERIAL INSTITUTIONS. Few 20th century comparative analyses of pre-industrial empires rival the comprehensive studies of Toynbee and Eisenstadt which, however, have not received sufficient attention in anthropology. Their studies, however, contain significant insights into the development of "imperial institutions" relating to communication, garrisons and colonies, provincial organization, capitol cities, official languages and scripts, legal systems, standardized measures including money, military organization, civil service, citizenship, and religion. This paper will summarize and evaluate their findings. (23)

Schaedel, Richard P. (Texas-Austin) PERMANENT AND TRANSITORY DIAGNOSTICS OF THE MIDDLE HORIZON IN THE CENTRAL ANDES. Since Uhle first established the Tiahuanaco phase as a pan-Peruvian phenomenon, the spread of what could best be called an iconographic cluster has been used as a diagnostic to separate "early" from late manifestations of what were generally labelled as local cultures or local cultural continua. This paper attempts to sum up most of the diagnostics that have been identified, place them according to referent locations, and to indicate whether the diagnostic is "intrinsic" or transitory and whether it is permanent, i.e. resulted in a transformation of the affected cultural continuum. (4)

Schaefer, James (Arizona) DAYS OF WINE AND ROSES: THE BYZANTINE OCCUPATION OF THE NEGEV DESERT. The political and economic circumstances of imperial control can stimulate population growth in areas of marginal agricultural potential. This can be seen in the Negev Desert, formerly the *limes* and a frontier province of Palestine in the Byzantine period (4th-7th century A.D.). Large prosperous communities arose that took advantage of imperially administered trade networks and military protection, despite marginal, unpredictable rainfall, and Bedouin raids. The analysis of mass produced amphorae from the site of Byzantine Jemmeh will be presented as an archaeological indicator of resource flow networks which were available to these frontier settlers. (23)

Scheick, Cherie (Museum of Northern Arizona) THE NATURE OF ARCHAEOLOGICAL TRANSECTS IN REGIONAL STUDIES, PART I. The Museum of Northern Arizona has intensively studied 47 archaeological sites impacted by the construction of the Colorado Power Station railroad spur which runs between the Puerto River valley and the Little Colorado River valley. The peculiar transect nature of the project presents advantages and disadvantages in the interpretation of archaeological data. Part I discusses the theoretical and methodological aspects of regional studies involving purposeful transects. Advantages and disadvantages are identified, and their effects upon the meaning of data are assayed. (42)

Schele, Linda (South Alabama) THE PLANTS AND ANIMALS ON THE SARCOPHAGUS SIDES AT PALENQUE. Ten figures representing seven individuals are portrayed on the sarcophagus sides in the Temple of Inscriptions. These individuals have been identified as ancestral persons who are presented in temporal and genealogical order. The iconography of the sides includes animals and floral motifs. The plants include avocado, cacao, chico zapote, nance, and guava. These fruits are still used as food sources in the Palenque region today and may well have been food sources during the Late Classic period. (3)

Schiffer, Michael B. (Arizona) SOME CHARACTERISTICS OF INFORMATION FLOW IN ARCHAEOLOGY. Despite recent and rapid growth in archaeological publishing outlets, it is becoming more, not less, difficult to do research that incorporates the latest advances on any particular subject. Some reasons for this apparent paradox are explored in the context of a general treatment of information flow in archaeology. Some remedies are suggested. (6)

Schlanger, Sarah (Washington State) LIMITS TO GROWTH IN PUEBLO III CLIFF DWELLINGS: AN EXAMINATION OF EIGHMY'S MODEL. A recent analysis of several Pueblo cliff dwellings led Eighmy to conclude that the growth of these sites tended to fit a logistic function and that growth was probably limited by density dependent factors such as carrying capacity. Because social factors or available building space may impose limits at individual sites, an attempt will be made to examine growth patterns in clusters of sites at the regional level. This level would seem more appropriate for discussion of limits to growth based on carrying capacity. (30)

Schreiber, Katharina J. (SUNY-Binghamton) PLANNED ARCHITECTURAL UNITS OF THE MIDDLE HORIZON: VARIATIONS ON A THEME. The point has often been made that architectural forms associated with the Huari "state" of the Middle Horizon Period are quite distinctive, especially as regards the degree of "planning" required in their construction. Architectural data from the recently excavated site of Jincamocco, a Huari state administrative center located in southern Ayacucho, are presented in order to arrive at a more refined sense of Huari site planning. Architectural remains of other Middle Horizon sites are compared in the hope of distinguishing regional, temporal, and functional variations of this basic theme. Finally, these data are viewed in light of a model of communication networks and hierarchies indicative of complex political organization. (4)

Schutt, Jeanne A. (New Mexico) ARTIFACT RECOVERY PROCEDURES AND MICROWEAR PATTERNS. Microwear pattern analysis is still in an early stage of development. Many scientists are working to replicate wear patterns observed on lithic artifacts recovered in the field, with the hope of determining how they were used in the past. This paper will address the problem of the creation of wear patterns through standard archaeological field recovery procedures. A range of commonly encountered lithic materials will be processed through three stages of recovery—field screening, transportation, and laboratory processing. (25)

Scoville, Douglas H. (see Lyons, T. R.) (24)

Seck, Susan M. (Nevada-Reno) RECENT ARCHAEOLOGICAL STUDIES IN SOUTHEASTERN NEVADA: SLIVOVITZ ROCKSHELTER. In 1977 a field party from the University of California at Berkeley conducted an archaeological excavation of Slivovitz Rockshelter in the Quinn Canyon Range. The site yielded a late occupation (900 A.D.-post contact times) sequence in association with Shoshonean Tradition and Fremont Ceramics. Results indicate use as a temporary hunting/gathering camp with emphasis on the hunting of bighorn sheep. Geographic features point to the existence of a bighorn kill site in the near vicinity and experimental faunal studies tend to confirm this. Results of the excavation and faunal experiments are discussed. (5)

Senter, Donovan C. (Mexico-Nacional Autonoma) THE TLALUICA OF THE VALLEY OF XOCALCO, MORELOS. A research report of recent excavations at the Postclassic site of Zacatetecalli will be presented. Based upon archaeological, linguistic, and documentary evidence, an attempt will be made to define the role the Tlahuica played during Toltec times. (40)

Sheafer, Harry J. (Texas A & M) TECHNOLOGY AND TOOL KITS FROM HINDS CAVE: TOWARD THE CONSTRUCTION OF BEHAVIOR SET MODELS. Stone tool assemblages from Hinds Cave are examined in the light of tool function, technology, and subsistence data. The character of the lithic tool assemblage specifically and the material technology in general notably lacks specialized or formal tool types throughout the 10,000-year long Archaic continuum. The result is a simplified, but difficult to interpret, archaeological record. The problems of determining tool function in assemblages where one tool may be used to perform several tasks is discussed, and results of organic residue analysis as it pertains to defining tool kits are incorporated. (28)

Sheafer, Harry J. (see Holloway, R. G.) (28)

Sharrock, Floyd (see Friedman, J.) (11)

Sheldon, Craig T., Jr. (Auburn-Montgomery) URBAN ARCHAEOLOGY IN BRUNSWICK, GEORGIA. In 1974 and 1975 archaeological excavations were carried out in the Bay Street Renewal area of Brunswick, a late Colonial town on the Georgia coast. Problems of salvage archaeology in an urban setting will be analyzed and aspects of the excavation, including the 19th-century camp and Portuguese Roman pottery, will be discussed. (7)

Sheldon, Elizabeth Shepard (Georgia State) A RECONSTRUCTION OF A PREHISTORIC ENVIRONMENT AND ITS USEFUL PLANTS: COLONEL'S ISLAND, GLYNN COUNTY, GEORGIA. Archaeological-botanical studies are many faceted because they employ information from diverse disciplines in order to explain the relationship of man to his floral environment. Results of the field study, library research, and laboratory analysis for Colonel's Island, a marsh island occupied continuously from approximately 2000 B.C. until the present, will be discussed. If time permits, a comparison will be drawn between man-land relationships on Georgia coastal barrier and marsh islands. (47)

Shimada, Izumi (Oregon) CAUSALITY OF CHANGES DURING THE MIDDLE HORIZON: A NORTH COASTAL PERSPECTIVE. The Middle Horizon has often been treated as an entity discrete from the broader cultural continuum. Further, the "Huari Empire" has been largely defined on the basis of ceramic distribution and by projection of Inca patterns backward in time. On the basis of recent studies on the North Coast, the validity of implicit assumptions of correspondence between social and ceramic changes will be considered. The exact cause-and-effect relationship between the Huari expansion and Moche decline has not yet been adequately defined. Transformations witnessed on the North Coast during the Middle Horizon will be discussed in light of my thesis that environmental and social stresses are creative. (4)

Shimada, Izumi (see Shimada, M.) (9)

Shimada, Melody GENERATIVE ASPECTS OF SOCIOECONOMIC STRESSES. Moche V Pampa Grande in the Lambayeque Valley, Peru, appears to have grown rapidly but ceased to be a viable sociocultural entity within a century of establishment. Elsewhere I postulated that Pampa Grande was under socioeconomic stresses stemming from a generalized environmental deterioration and change in population composition. I suggest that growth under such conditions necessitated adaptive shifts in the form of new social forms and systematization of viable extant socioeconomic institutions. Extensive networks of corridors, formal storage facilities, and diversified forms of "rectangular compounds" are considered the structural manifestations of these changes. (9)

Sidrys, Raymond C. (see Whitley, D.) (27)

Siemens, Alfred H. (British Columbia) MAYA RAISED FIELDS IN A BROADENED CONTEXT. Maya raised fields and related features on the two flanks of the Yucatan peninsula will be placed into a wider context within tropical lowland Middle American in order to aid the analysis of their chronology and function. Vestiges of comparable agriculture occur in a neighboring culture region, occupying calm-water enclaves within more volatile river systems. Their consideration should enlarge understanding of the pre-Colonial agriculture in the particular areas as well as the hydrological basis of raised field agriculture in general. It may perhaps permit a kind of analytical triangulation with what is known of hydraulic agriculture in Central Mexico. (10)

Silberbauer, F. B. (see Van Der Merwe, N. J.) (47)

Simmons, Alan H. (Arizona State Museum) MOVE THAT DIRT AND PASS THE BUCK—THE NEW MERCENARIES? In some circles of archaeology two rather unfortunate trends seem to be emerging. First is that many crew members, especially students, have become increasingly mercenary in their attitudes toward a discipline that has never been particularly profitable nor suited to an eight-hour day. Second, this mercenary attitude is frequently coupled with a decline in individual competence. Frequently, large projects must initially function as field schools, an inefficient and expensive method by which to meet professional standards. While not yet endemic, these trends suggest a view toward professionalism that is unhealthy. Pros and cons of the situation are discussed. (20)

Simmons, Alan H. (see Olszewski, D. I.) (19)

Skinner, S. Alan (SMU) PUBLIC INVOLVEMENT IN FIELD AND LAB. Traditionally, archaeologists have been willing, when pressed, to involve themselves with avocational archaeologists and occasionally with the general public that is concerned with the glamour of field and lab work in archaeology. A survey of public involvement in these aspects is presented, and recommendations are offered about how to involve the general public and maintain top quality professional studies. (18)

Smith, Jack, Jr. (Texas-Austin) RECUAY ICONOGRAPHY AND MIDDLE HORIZON STYLES. Middle Horizon iconography as usually interpreted excludes Recuay motifs, considering them to be exclusively produced and to have had their influence in the Early Intermediate Period. The terminal point for Recuay may have extended well into Middle Horizon, and the consequent influence of Recuay motifs on Huari-associated stylistic inventories may have been much more pervasive than has been acknowledged in the hitherto published literature. This paper attempts to demonstrate this thesis. (4)

Smith, Jason W. (Robert S. Peabody Foundation) THE MISSION RIDGE SITE: A PRE-WISCONSIN HUMAN OCCUPATION ON THE SOUTHERN CALIFORNIA COAST. A site was discovered consisting of a possible hearth associated with stone artifacts after a survey of the Mission Valley in San Diego. Brian Reeves and two Quaternary geologists from San Diego State identified the deposit containing the artifacts as a Sangamon interglacial soil dating to 70,000 B.P. Subsequently, over 20 quartzite artifacts were excavated including a chopping tool, several choppers, and many flake tools. In light of these finds, a case for an early Upper Pleistocene human presence in North America will be made followed by a discussion of the significance of poorly defined industries now found throughout the world. (11)

Smith, John P. (New Orleans) THE FORMS OF PATOLLI: THEIR INTERRELATIONSHIPS AND SOME SYMBOLIC ASSOCIATIONS. In the years following Tylor's late 19th century studies of Patolli, a Mesoamerican board-game, additional types of Patolli have been discovered. New ideas concerning religious associations of the game have been proposed. This paper will summarize these developments and I will offer tentative hypotheses concerning relationships between different forms of Patolli and some underlying cosmological symbols. (40)

Smith, Marion (see Hanson, G.) (13)

Smith, Michael E. (Illinois-Urbana) A COMPARATIVE PERSPECTIVE ON THE AZTEC MARKETING SYSTEM. Aspects of the peasant marketing system in the Valley of Mexico during late Aztec times are compared to analogous ethnographically and historically known systems from around the world. Models drawn from the work of Carol Smith and others in the field of anthropological regional analysis are applied to the data on Aztec exchange in an attempt to further our understanding of the Aztec economy. The Aztec market system is shown to be comparable in many respects to known complex interlocking central place systems, and the implications of this are briefly discussed. (40)

Smith, Randall M. (see Merbs, C. F.) (38)

Snarskis, Michael J. (Museo Nacional de Costa Rica) THE EARLIEST CERAMICS FROM COSTA RICA: LA MONTAÑA, A MIDDLE FORMATIVE SITE ON THE ATLANTIC WATERSHED. The La Montaña ceramic complex, from a site near Turrialba on the Atlantic watershed of Costa Rica, is the earliest known from the country and demonstrates the presence of sedentary agricultural communities by at least the Middle Formative (500-1000 B.C.). While La Montaña exhibits ceramic modes of form and decoration characteristic of both northern South America and Mesoamerica, the former tradition seems to dominate at the site. (17)

Snow, Clyde (F.A.A.—Civil Aeromedical Institute) THE CUMMINS PRISON EXCAVATION. In 1968, three skeletons were disinterred by unskilled labor at Cummins Prison Farm in southeast Arkansas. Before forensic examination, it was announced that the skeletons: (1) were those of convicts murdered by guards in the mid-1940's, (2) displayed evidence of antemortem violence and postmortem mutilation, and (3) represented only three of as many as 3,000 convicts killed and secretly buried at Cummins. State officials hastily claimed the graveyard was a cemetery existing prior to the establishment of the prison farm in 1902. Professional investigation has refuted both theories, demonstrating that much confusion could have been avoided had the excavation been conducted in a scientific manner by persons trained in archaeology and forensic anthropology. (31)

Snow, Cordelia T. (NPS) REMOTE SENSING MONITORING OF IMPACT ON CULTURAL RESOURCES. A principal focus of cultural resources management is the conservation of sites and materials, whenever possible, so that the data they contain may be available for future study. Although it has been obvious from the beginnings of archaeology that natural and post-depositional cultural processes are to a great extent responsible for the preservation and form of prehistoric materials when they are discovered, contemporary changes in the form and data content of cultural resources are often difficult to measure. Remote sensing techniques provide a means of monitoring subtle changes in cultural resources that may affect scientific conclusions drawn in the future; methods by which such monitoring can be efficiently applied over both short and long range time periods will be outlined. (24)

Spath, Carl D. (Illinois-Urbana) EL MUERTO ROCK SHELTERS: A STUDY IN NONCERAMIC CULTURE ON THE GUAYAS COAST, ECUADOR. Many previous archaeological studies on the Guayas Coast have referred to evidence of progressive or cyclic Post-Pleistocene desiccation in this region, particularly over the last three to four millennia. New information from the El Muerto Rock Shelters in the Playas-Posorja zone and a reassessment of previous work in the area suggest not only continuous occupation since the Pleistocene, but that evidence previously interpreted as indicating desiccation is the by-product of human disturbance, particularly in the post-conquest period, and unrelated to climatic fluctuation. (17)

Spear, Laurence M. (New Mexico) SOME GEOGRAPHIC TECHNIQUES AND THEIR APPLICATION TO INTRASITE SPATIAL ANALYSIS. Isolation of spatially differentiated activity areas composing archaeological sites has become the focus of an increasing number of studies. Approaches to the analysis of spatial distribution of artifacts have, however, often lacked a coherent methodological framework. It is suggested that geographic methodologies could facilitate empirical generalizations and serve as a basis for further systematic modeling of intrasite activity areas. Varying methods of cartographic depiction and centrography are applied to the problem of intrasite spatial analysis. Examination of the ability of these techniques to alter the portrayal of a statistical surface is discussed. Particular emphasis is placed upon the use of these techniques as foundations for deductive modeling to aid in archaeological explanation. The well established use of these methods in geographic research constitutes a previously accepted approach which is inherently applicable to similar problems encountered in archaeological research. (6)

Spielbauer, Ronald H. (Miami-Ohio) TRACE ELEMENT ANALYSIS: A SUGGESTED KEY TO THE IDENTIFICATION OF MILL CREEK AND HARTLINE CHERTS. Discrimination between two different chert varieties, the Mill Creek and the very similar recently defined Hartline which are available in southern Illinois, is a problem for archaeologists concerned with the acquisition, distribution, and utilization of these cherts by midwestern prehistoric societies. Since these two chert types overlap in their respective ranges of macroscopic variation, an independent means needed to be developed to facilitate the requisite identification and discrimination. Preliminary investigations utilizing neutron activation analysis have indicated that such is possible on the basis of trace element composition. (43)

Spitzer, Michael G. (SMU) PREDICTING WORKPIECE HARDNESS FROM MICROFLAKE SCARS ON ORTHOGONAL CUTTING TOOLS. An experiment conducted to allow construction of a predictive equation to solve for workpiece hardness for orthogonal cutting tools is discussed. The experimental design and relevant variables are briefly described, and the results obtained for

predicting workpiece hardness are addressed. The results provide strong encouragement for the construction of a more refined functional typology for orthogonal cutting tools than has been attempted before. (25)

Sprunk, Larry J. (Historical Surveys, Inc.) THE EFFECT OF DISPLACEMENT ON RURAL PEOPLE IN MISSOURI'S OSAGE RIVER BASIN. Using characteristic tape excerpts the presentation will attempt a portrayal of feelings among rural Missourians who have moved or will move prior to impoundment at the Harry S. Truman Dam Project. The effect of moving upon different age groups will be studied as will the degree to which the length of family history in the area affects attitudes and opinions regarding displacement. Included in these areas of analysis is the question whether rural land ownership in the area has given the people a heightened sense of place or identity with the land and, if so, to what extent are the beginnings of estrangement being felt. (26)

Stafford, Barbara A. (Arizona State) A TECHNOFUNCTIONAL ANALYSIS OF PAYSON LITHICS: A NEW METHOD. Morphological approaches to lithic typologies provide little data as to manufacture and utilization. To determine modes of manufacture and utilization, a microwear analysis was conducted on lithic assemblages collected from a series of habitation and limited activity sites located near Payson, Arizona. Quantification of hinge and invasive fractures per artifact according to a 6-polar grid constituted the major portion of the microwear analysis. Quantification was necessary to differentiate modes of use, relative hardness of the material worked and modes of manufacture. Factor and cluster analyses grouped artifacts according to the degree of accumulated damage. Supplementary data (i.e., pollen, distributional, ecological) were used to differentiate further activity sets that varied as to site type and environmental location. (25)

Stafford, Barbara A. (see Stafford, C. R.) (25)

Stafford, C. Russell (Arizona State) THE IMPLEMENTATION OF EXPERIMENTAL DESIGN IN LITHIC STUDIES. As experiments in lithic technology have become more frequent, a number of important issues have arisen. It is argued that the use of the methodology of experimental design be employed to increase efficiency, control exogenous variables, and improve comparability between studies. Formal experimental designs can further be employed to reduce the cost/benefit ratio. Theoretical expectations and effect size are critical in the selection of an appropriate experimental design. These effect sizes have consequences in the determination of sample size, power, and the relationship between significance tests and measures of correlation. Various experimental designs applicable to lithic studies will be discussed. (25)

Stafford, Thomas (see McLaughlin, D. E.) (47)

Sternberg, Robert (see Eighmy, Jeffrey) (6)

Stickel, Gary (see Koerper, H. C.) (6)

Stocker, Terry (Illinois-Urbana) TEZCATLIPOCA AND QUETZALCOATL. The confrontation between Tezcatlipoca and Quetzalcoatl is analyzed with Wallace's paradigmatic model for explaining culture change which is predicated on an ideological conflict that ultimately serves to justify the abandonment of one cultural orientation and the adoption of other values. The confrontation between Tezcatlipoca who advocated human sacrifice and the losing god who opposed human sacrifice is interpreted as a focal point which might have facilitated an increasing institutionalization of militarism and heart sacrifice in Mesoamerican culture history. Diachronic archaeological evidence is presented. (40)

Stoutamire, James W. (Florida State) FORENSIC ARCHAEOLOGY: A COURSE OUTLINE. Florida State University has conducted classes in Forensic Archaeology since 1976. During this time, we have refined the course design and content. Lecture emphasis has been placed on archaeological technique, osteology, bone pathology, identification of remains, collection and preservation of evidence, search techniques, and various aspects of criminal investigation. Field experience has consisted of the excavation of prepared graves utilizing plastic skeletons and associated planted evidence of criminal activity. In association with the field experience we have conducted experiments on the preservation of evidence in the field. (31)

Stoutamire, James W. (see Karwesky, R. A.) (46)

Straus, L. G. (see Clark, G. A.) (34)

Struever, Stuart (Northwestern) PRIVATE SUPPORT OF ARCHAEOLOGY: THE NORTHWESTERN UNIVERSITY EXAMPLE. As the demands of modern archaeology increase the financial require-

ments of research and as the federal government takes a stronger position in resource management/oriented archaeology, it becomes important to evaluate the possibilities of private support for archaeology. Since 1964, the Northwestern Archaeology Program (N.A.P.) has built a support base which derives 80% of its funds from private sources. This paper will explore some of the successes and failures in obtaining private support for the Northwestern Program. (18)

Stuart, David TOPOGRAPHIC VARIABILITY AND SITE PLACEMENT: DEVELOPING A STRATEGY FOR MAXIMIZING SMALL PROJECT SURVEY DATA. It has been found that small project rights-of-way are often located at loci characterized by relief that is different from that of the surrounding area. These right-of-way locations are selected on the basis of properties important to the construction and maintenance of pipelines, roads, etc. This paper focuses on the relationship between the degree of brokenness in topography and the placement of archaeological sites. The hypothesis that site density covaries with topographic variability is presented and evaluated against data gathered from a series of small-scale linear surveys conducted in New Mexico's San Juan Basin. The effects of the biases incurred by engineering needs on regional research designs and on predictive models concerned with site distribution are discussed. (39)

Sullivan, Thelma D. (CIS-INAH) TLATOANI AND TLATOCAYOTL IN THE SAHAGÚN MANUSCRIPTS. The majority of Sahagún's informants were *principales*. Thus, it can be assumed that the data they supplied on the functions and duties of the *tlatoani*, that are contained in the Florentine and Madrid Codices, were first hand. The concept of ruler and rulership is most clearly etched, however, in the *huehuetlatolli* rhetorical orations. This paper will endeavor to bring together all relevant material found in Sahagún's manuscripts on the *tlatoani* and *tlatocayotl*, some of which is still untranslated and unpublished. (16)

Sutro, L. S. (Arizona) ACTIVITY STRUCTURE AT WART ROCKSHELTER IN EAST CENTRAL ARIZONA. Excavations at the Wart Rockshelter reveal a multi-component occupation spanning the period A.D. 500-1300. Analyses of artifacts from temporally distinct assemblages show that inter-assemblage variability is limited. Formal tool classes and debitage reflect an emphasis on hunting and plant processing, even during periods when agricultural intensification is thought to have occurred. The site is interpreted as a limited activity locus which was occupied with greater frequency during A.D. 1200-1400. These data tend to validate models emphasizing increased wild resource extraction during the late prehistoric period when domesticated plant resources may have been subject to increased annual fluctuations in yields. (38)

Sweeney, Jeanne W. (Copan Project) CERAMIC MOTIFS AND SUBSISTENCE. The pottery from Precolumbian sites in northwest coastal Guanacaste has been studied and put into chronological series by attributes and modes. Many faunal species and a few botanical species are used in the artistic repertoire. What do commonly used motifs in a ceramic tradition tell about the diet? An attempt is made to ascertain how well these correlate with faunal species recovered at three sites in Guanacaste. Trial results seem to indicate that subsistence fauna are under-represented in the ceramics, suggesting that species depicted may be of mythological importance. For example, the macaw and the jaguar feature in many myths of tropical forest peoples to the south. (32)

Synenki, Alan T. (SIU-Carbondale) A MULTIVARIATE APPROACH FOR EXAMINING THE RELATIONSHIP BETWEEN SURFACE AND SUBSURFACE REMAINS. This study demonstrates that the relationship between surface and subsurface remains is internally complex and highly variable at both the intrasite and intersite levels. Consequently, the predictive ability of surface remains can be potentially useful only when various cultural and noncultural variables are identified and systematically considered. Multiple regression analysis, using the partial correlation statistic is employed to measure the unique contribution of each of these variables toward the explanation of the relationship between surface and subsurface remains. (22)

Taranik, Linda L. (Oberlin) THE USE OF ATTRIBUTAL ANALYSIS IN THE DESIGN OF STONE TOOL TYPOLOGIES: A CASE STUDY BASED ON THE UPPER PALEOLITHIC OF SOUTHWESTERN FRANCE. The results of a quantitative study that is based on the analysis of morphological variability among Upper Paleolithic stone tools from the Beauronian level at Solvieux (Dordogne) are presented. This study indicates the manner in which attributal analysis can be employed to discriminate typologically significant attribute covariation patterns among formally similar tool classes such as truncation burins and truncated blades. The implications of this study for current typological systems are explored. (34)

Tartaglia, Louis James (California State-Northridge) EARLY PREHISTORIC SHOSHONEAN CONTACTS IN SOUTHERN CALIFORNIA. Analysis of the Chatsworth cairn site suggests that it represents one of the earliest Shoshonean occupations (mourning ceremony site) in southern California (400 B.C.-A.D. 800). The Shoshonean mourning ceremony is a commemoration cere-

mony for either specific important individuals or for all the individuals that died the previous year. Cremated reburials are indicative of this specialized mortuary practice for high status individuals; thus, the nonrandom patterning of associated artifacts indicates ascribed status. Central and peripheral activity areas are defined based on the spatial distribution of trade materials and pH soil testing. Astronomical alignments of projectile points support the cardinal directions ethnographically recorded with the Shoshonean mourning ceremony.(11)

Taylor, Richard (see Hanson, G.) (13)

Terrel, James A. (Eastern New Mexico) QUANTITATIVE ARCHITECTURAL ANALYSIS AT GUADALUPE RUIN, SANDOVAL COUNTY, NEW MEXICO. A methodology for recordation of architectural variability has been developed from previous research. The approach incorporates both traditional aspects of architectural analysis, i.e., masonry typologies, abutment studies, etc., and more recent developments, i.e., architectural attribute analysis. Utilization of the method provides a quantitative basis for the estimation of stabilization requirements and allows the use of multivariate statistical procedures for the delineation of architectural subpopulations. Data from excavation and analysis of cultural materials may be used to test defined subpopulations for cultural significance. Application of the method at Guadalupe Ruin provides a background for discussion of the sampling procedures, attributes measured, and the problems and limitations of the method.(15)

Terrel, James A. (see Baker, L. L.) (6)

Thomas, David Hurst (American Museum) A PRELIMINARY REPORT ON PALEO-INDIAN SETTLEMENT PATTERNS AT PLEISTOCENE LAKE TONOPAH. Systematic regional surveys in the Reese River and Monitor valleys have disclosed a relatively stable upland subsistence-settlement system which began about 7,000 to 8,000 years ago, and survived into the ethnographic present. Earlier settlements in the central Great Basin are known to have clustered about Pleistocene remnant lakes, and a recent systematic random sampling survey was conducted to determine the nature and extent of these Paleo-Indian settlements near Pleistocene Lake Tonopah. We discuss the sampling design and present some quite tentative findings from the artifact analysis and microwear studies. The paper concludes with some preliminary notions about the major settlement shift from lowland to highland occupations in the central Great Basin.(5)

Thomas, George B. (North Texas State) SURVEY METHODS AND SETTLEMENT PATTERN AT FORT HOOD, TEXAS. Six years of amateur archaeological survey on a military reservation are discussed, with emphasis on methods and research designs. Acting under archaeological survey permit authorization from the Department of the Interior for two of these six years, the Fort Hood Archaeological Society surveyed portions of the 217,000 acres (339 sq. mi.) of Fort Hood for site distribution. Under varying capabilities of supervision, varying research designs, and survey methods emerged. A tentative settlement pattern study on the basis of chronologically diagnostic artifacts (projectile points) and terrain context showed trends similar to those elsewhere in central Texas.(35)

Thomas, Trudy (American Museum) MICROSCOPIC AND STYLISTIC ANALYSIS OF FOUR HUNDRED INCISED STONES FROM GATECLIFF SHELTER, NEVADA. Four hundred incised limestone slabs were recently excavated from datable levels of Gatecliff Shelter, a pictograph cave in central Nevada. The very mass of incised stone yielded by this site, taken together with a second collection of approximately 400 additional incised stones found by surface survey in the Monitor Valley area, makes it clear that incising of non-utilitarian materials was a major tradition in the central Great Basin for thousands of years. This paper offers a macroscopic and microscopic approach that is yielding data about formulation of designs, order of marking, and other structuring information.(5)

Thompson, Donald E. (Wisconsin-Madison) STRUCTURE-FUNCTION IN PRECOLUMBIAN VILLAGES IN THE PERUVIAN NORTH HIGHLANDS. Late Precolumbian villages along the Upper Marañon drainage are described and speculations are made as to structure-function and community organization. The starting point for such speculation will be villages studied earlier in the Central Highlands in the Department of Huánuco. The latter communities are better understood because of early ethnohistorical data provided by the visita of Iñigo Ortiz de Zúñiga and other sources.(9)

Thoms, Alston V. (Texas Tech) CONTRACT ARCHAEOLOGY, RESEARCH DESIGNS AND INTENSIVE SURVEYS. This paper discusses the concepts of and relationships among contract archaeology, research designs, and, in particular, intensive surveys. The related goals of these aspects of contemporary archaeology are addressed. Specific contract projects from several regions are used as subject matter. Attention is given to the development of these projects

from the RFP/proposal stage to the final report. Special consideration is given to time/money costs of the various intensive surveys and their resulting data bases. The paper also explores both theoretical and practical repercussions of different approaches to intensive surveys conducted under the auspices of contract archaeology.(20)

Thorbahn, Peter (Brown) SITE SURVEY IN NEW ENGLAND: A FIELD EXPERIMENT IN SAMPLING THEORY AND METHOD. A 25-kilometer highway right-of-way in southeastern New England has been surveyed twice by two different investigators. The first used a stratified sample of 30% of the area based on locational models and located seven prehistoric sites. The other surveyed 100% of the highway and discovered 35 sites. The five-fold increase has shown that theoretical assumptions and field methods used in the first survey, which are generally accepted by survey archaeologists, are highly questionable as applied to New England. Alternate sampling models and field procedures are suggested and compared for cost effectiveness.(13)

Topic, John R. (Trent) CLASS, PRESTIGE, BUREAUCRACY, AND AUTHORITY IN PRE-INCAIC PERU. This paper will briefly discuss the advantages of reconstructing patterns of class, prestige, authority, and information flow in complex societies, and the kinds of data that may be used for such reconstructions. An analytical framework will be presented which relates social structure to factors leading to cultural complexity. The paper will then examine how the analytical framework can be used to understand the increasing complexity found in the cultural sequence at Chan Chan.(9)

Topic, John R. (see Topic, T. L.) (17)

Topic, Theresa L. (Trent) FORTIFICATION SYSTEMS OF NORTHERN PERU. In the summer of 1977, a program of location, survey, and mapping was begun on fortified and defensively located sites in the vicinity of Otuzco, Peru. The aim of the research is to trace the development of militarism in northern Peru, plot shifts in the borders of prehistoric states in the area, and examine changes in coast-sierra interaction through time. The survey, combined with air photo study, has located 300 probable fortified features, indicating an unexpectedly great preoccupation with defense, particularly toward the end of the prehistoric sequence.(17)

Torrence, Robin (Sheffield) PRODUCTION FOR EXPORT AT THE MELIAN OBSIDIAN QUARRIES. Virtually all the obsidian found on prehistoric sites in the Aegean c. 9,000-3,000 B.P. was initially quarried at one of either of two source areas on the Cycladic island of Melos. Identifying the behavior recorded at these quarry sites is important because it should reflect the constraints operating on the exchange system as a whole. Quantitative and qualitative study of the debitage at Sta Nychia and Dhemenagaki has demonstrated that prismatic blade core preforms (macrocores) were the major quarry products. Differences in activity patterns between and within workshop areas have been investigated in the field and with computer mapping routines. Estimates of the amount of macrocore production are made. Finally, the results of the macrocore studies are discussed in relation to the pattern of obsidian exchange as known from other types of sites.(33)

Tuttle, H. D. (Hawaii) THE APPLICATION OF THERMOLUMINESCENCE TO PROBLEMS OF DATING AND SOURCING HAWAIIAN VOLCANIC GLASS ARTIFACTS. The primary dating method now employed in Hawaiian archaeology is the hydration rind measurement of volcanic glass artifacts. Research on the dating of glass by thermoluminescence is now ongoing. If successful, this will provide an independent assessment of the age of geological and some archaeological specimens of volcanic glass. In addition, thermoluminescence is also being explored as a means of "fingerprinting" volcanic glass artifacts may be identified with source or quarry areas.(14)

Turnbaugh, Sarah Peabody (Rhode Island) ALTERNATIVE APPLICATIONS OF THE MEAN CERAMIC DATE CONCEPT FOR INTERPRETING BEHAVIOR. By illuminating inconsistencies between material culture chronology and historically-documented occupation periods, South's Mean Ceramic Date concept may be employed as a tool for furthering interpretation and explanation of human behavior in three categories: intrasite/intrafeature, intersite/interfeature, intrasite/interfeature. In the latter category, in-depth consideration of two excavated structures at Boston's Fort Independence illustrates the use and limitations of the concept as a tool for cultural explanation. The quantitative approach to ceramic analysis is combined with qualitative considerations of artifacts, features, and stratigraphy in testing three hypotheses and reaching a consistent explanation of past lifeways at the 1803-33 fort.(35)

Turnbaugh, William A. (Rhode Island) FLOODING AS A TRANSFORMER OF THE ARCHAEOLOGICAL RECORD. Acknowledging that the archaeological record represents the product of a complex interaction between natural and cultural processes over time, this paper focuses on the relationship between geomorphological stream-activities and archaeological field evidence.

An inquiry based upon some 226 prehistoric sites in north-central Pennsylvania suggests the degree to which flooding, erosion and deposition (N-transforms) may affect the discovery, recognition and interpretation of archaeological units in the vicinity of streams. Data from this study are further utilized in an attempt to address questions of past human behavior regarding settlement site selection in relation to streams (C-transforms), and demonstrates that a better understanding of stream dynamics may have some predictive potential for field archaeologists. (35)

Turnbaugh, William A. (see Turnbaugh, S. P.) (35)

Turner, Christy G., II (Arizona State) THE DENTITION OF THE CHILEAN CERRO SOTA-PALLI AIKE CAVE INDIANS AND THE PEOPLING OF THE AMERICAS. Teeth and tooth socket morphology of 11 cremated individuals, found with extinct sloth and horse remains (^{14}C dated between 8,700 and 11,000 B.P.) show a north Asian affiliation for these Paleo-Indians, and suggest trait stability to the present day. Traits shared with north Asians and modern Indians are incisor shoveling and double-shoveling, 1- and 2-rooted upper 2nd molars, 1-rooted upper first premolar, 5-cusped lower 2nd molar, and 3-rooted lower 1st molars, among others. This complex did not occur in European Upper Paleolithic or Neolithic peoples suggesting north China to southeast Siberia as the homeland of Paleo-Indian culture and people. (17)

Turpin, Solveig A. (Texas-Austin) TEMPORAL AND SPATIAL VARIABILITY IN PREHISTORIC GREAT KIVAS OF THE MOGOLLON REGION. Mogollon Great Kivas, assumed to be well defined and recognized cultural manifestations amenable to modal analysis, are analyzed using a series of computerized statistical programs. Variability and gaps in the archaeological record dictate that Great Kivas be seen from a polythetic perspective. Techniques for the extraction of temporally-weighted variability are used to preserve the spatial integrity of data in order to verify or realign the boundaries of the Mogollon "Branches." (45)

Upham, Steadman (Arizona State) UP THE CANAL WITHOUT A PATTERN: MODELLING HO-HOKAM INTERACTION AND EXCHANGE. The hypothesis that the degree of interaction increased through time in the Hohokam cultural tradition is examined. Test implications are developed that relate increasing interaction to changes in the distributions of ceramic attributes, settlement location, and irrigation systems. Data from the Salt River Valley and environs are used in the analysis. Some of the dramatic changes that occurred from pre-Classic to Classic periods are examined as a function of changes in the organization and intensity of interaction. (1)

Utermohle, Charles J. (Arizona State) HOHOKAM BURIALS FROM THE SALT RIVER VALLEY, ARIZONA. Recent archaeological work in the Salt River Valley, Arizona, especially at the AZ U:9:42 (ASU) salvage site in Tempe, has produced data from over 30 burials representing the Classic and Sedentary periods of Hohokam. This report will describe the burial practices observed and the skeletons recovered. Much of the skeletal material is well preserved by Hohokam standards and lends itself nicely to biological analysis. Of special interest is the age-sex profile of the individuals relative to dental and skeletal pathology including caries, osteo-arthritis, bifid ribs, and severe developmental defect of the first cervical vertebra. (38)

Vander Leest, Barbara (Wisconsin-Milwaukee) THE RAMSEY FIELD, CAHOKIA SURFACE COLLECTION: SOME PRELIMINARY RESULTS. This report is a discussion of the ongoing analysis of a controlled surface collection from the Ramsey field area of the Cahokia site, East St. Louis, Illinois. Ramsey field lies approximately in the center of the Cahokia site, just east of Monks Mound, the largest prehistoric structure north of Mexico. The surface collection covers over 41,000 square meters and includes over one quarter of a million artifacts. The use of computer plotting routines to trace the distribution of various artifact types and ceramic attributes has shown extraordinary potential. Preliminary results have identified a number of features and functional areas which had previously been unknown. Differential use of some areas through time is also evident. (35)

Van der Merwe, Nikolaas J. (Cape Town) CARBON ISOTOPES AND THE INTRODUCTION OF MAIZE TO OHIO. The effect on $^{13}\text{C}/^{12}\text{C}$ ratios in human bones resulting from the introduction of a C-4 cultigen (e.g., maize) into temperate environments has been demonstrated for a sample of 10 skeletons from New York. The method is confirmed by results on 20 skeletons (10 male, 10 female, age c. 25 years) from the Du Pont Site, 33 HA 11 (Late Archaic, c. 2500 B.C.) and an identical sample from the Turpin Site, 33 HA 19 (upper Mississippian, c. 1300 A.D.). The Du Pont material shows ^{13}C depletion of about 21 per mil, indicating zero intake of C-4 plants; the Turpin material is depleted by 12 per mil, equivalent to a diet that includes 50% of C-4 plants. Implications of results from other Ohio and Illinois sites are described. (47)

Van Rinsvelt, Henri A. (see Mock, D. R.) (43)

Vaughan, Hague H. (Maine) INTERPRETATION OF PREHISTORIC DISTURBANCE OF VEGETATION IN THE AREA OF LAKE QUEXIL, PETEN, GUATEMALA. Analysis of pollen and carbonized plant fragments in Lake Quexil and Lake Sacnab sediments spanning the last 8,000 and 6,000 years respectively are presented. Interpretation is complicated by carbonate errors in dating as well as aspects of sedimentation, representativity and vegetational process; yet relations between climatic change and Mayan activities in these basins are indicated. These and other interpretational limitations excessive within, though not restricted to, tropical areas are discussed as potential sources of misunderstanding within and between disciplines, particularly when the theoretical and methodological assumptions that underlie interpretation are either not fully presented or appreciated. (10)

Verhak, Rain (Oklahoma) ARCHAEOLOGICAL SURVEY ALONG THE SHEYENNE RIVER, EASTERN NORTH DAKOTA: A PRELIMINARY REPORT. The University of Wisconsin-La Crosse, under contract from the St. Paul District Corps of Engineers, initiated an archaeological survey during the fall of 1977 in eastern North Dakota. Several selected areas were surveyed, and over 50 prehistoric and historic sites were recorded. Historic sites, for the most part, consisted of pioneer dugout depressions. Prehistoric sites consisted of camp and village locations, burial mounds, and tipi rings. This paper provides preliminary results of the survey and speculates about relationships with similar prehistoric cultures in the Northern Plains and Eastern Woodland areas. (11)

Versaggi, Nina M. (SUNY-Binghamton) SMALL-SCALE SURVEY: METHODS OF ORGANIZATION AND MANAGEMENT. Short, small-scale surveys pose various problems in terms of management of the projects, organization of research, and retrieval of data. In the Northeast, the small, short-term survey is more the rule than the exception, especially in regard to highway projects. This paper briefly outlines some of these major problems in terms of management and organizational needs, and discusses one of many workable "answers" to these problems. The SUNY-Binghamton "SWAT" approach to small reconnaissance and site examination in our highway program is presented, focusing on how the approach complies with agency guidelines and constraints while contributing to archaeological research. (39)

Vogel, J. C. (see Van der Merwe, N. J.) (47)

Wakes, Arthur W. (Arizona) THEY DON'T MAKE THEM LIKE THEY USED TO. The island of Cozumel, lying off the northeastern coast of the Yucatan Peninsula, was the location for the joint University of Arizona and Harvard University survey and excavation program between 1972 and 1974. One of the areas being addressed in the analysis of the recovered materials is to determine what trends can be discerned in the techniques and forms of manufacturing used by the island's inhabitants. It is felt that the artifacts created with shell, one of the few locally available natural resources, is an ideal medium for the study due to the volume of artifacts recovered. (3)

Volman, Kathleen (see Freeman, L. G.) (34)

Volman, Thomas P. (Chicago) MIDDLE STONE AGE ARTIFACT VARIABILITY IN THE SOUTHERN CAPE PROVINCE, SOUTH AFRICA. In southern Africa recent paleoanthropological research has begun to shed some light on the nature and evolution of resource exploitation in the Upper Pleistocene and Holocene. Sites of very early Upper Pleistocene age in the region have provided the earliest evidence in the world for the systematic exploitation of marine resources. Both marine and terrestrial faunal remains indicate that the last 200,000 years were characterized by important long-term changes and regional differences in subsistence strategies. This paper reports some aspects of the technological component of these changing adaptations, based on the analysis of Middle Stone Age artifacts assemblages from sites in the southern cape Province, South Africa. (34)

Wrenland, James M. (Texas-Austin) THE MOCHÉ-HUARI CULTURAL INTERFACE: TEXTILE TECHNOLOGY AND ICONOGRAPHY OF A SLIT TAPESTRY FUNERARY GARMENT. The recent autopsy of a high-status Peruvian mummy fardel has yielded an elaborate wool slit tapestry mantle found wrapped directly around the body of a naturally "mummified" male about 40-45 years old. The distinctive iconographic and technical attributes of this fabric might well be associated with a Moche-Huari cultural interface. In an effort to differentiate the putative contributions of the Mocheoid and Huari (and other possible) components, the stylistic and technical analysis of this garment will include a brief critical review of the diagnostic textile features of these two periods. (4)

Waide, Robert B. (Wisconsin) THE EFFECT OF SLASH-AND-BURN AGRICULTURE ON THE AVIFAUNA OF SOUTHERN CAMPECHE. The successional stages of vegetation that occur after abandonment of a *milpa* support very different bird communities. Moreover, a large number of species that exist in mature forest do not occur in disturbed or successional habitats. While in

some cases subsistence farming may enhance the populations of some bird species by providing more edge habitat, a more intensive agricultural system usually results in decreased diversity and abundance. Data from Campeche are used to demonstrate these points. (10)

Wait, Walter K. (NPS) THE SMALL SURVEY IN REGIONAL INTERPRETATIONS: THE SAN JUAN DATA BASE PROJECT. In an effort to demonstrate the utility of small surveys in developing statements of a regional nature, the Southwest Cultural Resources Center, National Park Service, has inaugurated a project that should provide information on all archaeological surveys and sites recorded for the 30,000 square mile San Juan Basin (New Mexico). It is estimated that at the end of the collection phase of the project, over 30,000 sites and 5,000 surveys will have been coded for computer analysis. This paper will discuss the status of the project, mention its implications for future cultural resource management assessment and demonstrate how the small survey can play a vital role in regional archaeological interpretation. (39)

Walker, Deward (Colorado) USE AND ABUSE OF ETHNOGRAPHERS IN CULTURAL RESOURCE MANAGEMENT. Following current antiquities legislation, archaeology has assumed the role of ethnography in the description and presentation of North American culture history. "History" has assumed responsibility only for historic European remains. Therefore, we must ask who is concerned with the proto-historic and ethnographic periods. There is no ethnographically oriented program within current cultural resource management project designs or funding priorities. Thus, an apparent result of the cumulative antiquities legislation has been to formally exclude ethnographers and to diminish new ethnographic research in conjunction with cultural resource management. Is this wise? (12)

Walker, Geoffrey (Michigan) HUMAN IDENTIFICATION: QUANTIFICATION AND RECOGNITION OF SKULL FRAGMENTS IN FORENSIC ARCHAEOLOGY. Human bone analysis concerns age, sex, and ethnic group classifications, and depends on their state of preservation. Graves are grouped into two types: (1) ancient burials—identification and reconstruction of living forms is more an art than a science in this area, (2) modern burials—favorable conditions for cranial patterns make it possible to compute sex, age, and ethnic background. Our data is best suited to discriminate between blacks, whites, and Indians. Our method will compute the size and shape of missing skull fragments and build a complete skull representation within known limits. Though human variation causes some questioning of the reliability of these methods, they provide a powerful tool for recognition and classification, improving as data accumulates, and providing the forensic archaeologist with a compass in a biological and sociological wilderness. (31)

Walker, Terry (Edge of Cedars Museum) ML-1147, AN UNDISTURBED CLIFF DWELLING IN SOUTHEASTERN UTAH. This undisturbed PIII cliff site was discovered by USFS personnel in 1968. Recent partial excavation of the site revealed that it had 21 definable structures and 15 "utilitarian" use areas. These features appear to be organized into room clusters and habitation units, which may represent a localized lineage settlement pattern. Tree-ring studies indicate that most of the construction was in the 13th century and that roof beams were cut during the growing season. There is strong evidence, however, for winter occupation of the site. (30)

Wapnish, Paula (Smithsonian) THE ZOOARCHAEOLOGY OF EMPIRES. The hypothesis that Tell Jemmeh, located in the northern Negev, is the garrison city of Arza mentioned in the annals of Esarhaddon, king of Assyria (680-669 B.C.) has been advanced on architectural and artifactual evidence. This notion can be tested by the faunal remains recovered from the site in two ways. The proportions that the various species contributed to the sample is a measure of the interaction of the site with the rest of the Assyrian Empire. Changes in the animal management systems documented at Tell Jemmeh measure the needs of a military encampment for outside supply. (23)

Washburn Dorothy K. (California-Berkeley) A REANALYSIS OF THE GRAVE GOODS FROM PUEBLO BONITO: SOME MEXICAN AFFILIATIONS. A problem in determining the affiliation of a new design system indicated by the Pueblo III hatched ceramics (Gallup B/W, Chaco B/W) and a new vessel form (cylinder jars) prompted a reexamination of the other associated grave goods in several unusual graves in Pueblo Bonito. This paper discusses the similarity of sandals from representations of Post Classic lapidary and pochteca deities with those painted on a figurine foot from grave goods with a burial in Room 329. (45)

Watson, Richard P. (Texas-Austin) THE RECONSTRUCTION OF PREHISTORIC AGRICULTURAL POTENTIAL FROM ENVIRONMENTAL PARAMETERS: THE CHIMU CASE. The use of modern techniques of crop yield prediction are discussed with regard to their potential for reconstructing prehistoric productive capacities for irrigation agriculture. The use of such techniques appears to offer an approach that could provide readily comparable data from different regions and environments. The application of a technique based on evapotranspiration will be dis-

cussed as it is being applied to late Chimu agriculture in two valleys on the north coast of Peru. (17)

Way, Karen L. (Bureau of Land Management) GUIDELINES FOR THE DESIGN OF SMALL PROJECT REPORTS. People from industry, government, and the academic world form the major components of the contract archaeology audience. The assumptions a report writer can make about such an audience are discussed and the special needs of each audience group are identified. Some general guidelines for the design of reports meant to satisfy all of these groups are presented, and suggestions for their special application to the small survey project are offered. (39)

Weaver, Donald E., Jr. (Museum of Northern Arizona) THE NORTHERN FRONTIER, HOHOKAM REGIONAL DIVERSITY AS SEEN FROM THE LOWER SALT RIVER VALLEY. Recent surveys and excavations in the Hassayampa, Agua Fria, New River, and Cave Creek drainages have documented considerable regional variation in the "normal" Hohokam pattern. The variation appears to be primarily related to environmental diversity, frontier stress, and external influences from neighboring cultures. The northern frontier regional Hohokam pattern includes extensive dry farming systems as well as irrigation systems based on permanent and intermittent surface water supplies; semi-subterranean and surface structures constructed of rock, perishable material, and adobe; and both clustered and dispersed settlement patterns. New knowledge of regional diversity in the northern frontier provides insight into many subsequent developments in the Hohokam heartland. (8)

Weder, Dennis (Archeological-Environmental Research Corporation) THE FUNCTIONAL INTERPRETATION OF LITHIC SCATTERS DURING SURFACE RECONNAISSANCE. Since lithic scatters are the most prevalent site type found during surface reconnaissance operations, the interpretation of lithic scatters is an important source of information. Techniques for analyzing and interpreting bifaces, fragmentary projectile points, and the manufacturing stages that lead to finished tools will be discussed from the standpoint of the archaeological surveyor. With the ability to interpret the aboriginal activities conducted at a lithic scatter, the data base for the analysis of subsistence cycles becomes larger. (19)

Weisbrod, Richard L. (UCLA) AN EXAMINATION OF PATTERN CLASSIFICATION TECHNIQUES IN ARCHAEOLOGICAL TYPOLOGY. The two basic approaches to archaeological typology call for two different kinds of mathematical tools. The first approach assumes types are inherent in the data and the task is to discover them. Mathematical tools appropriate in this context, search techniques such as numerical taxonomy, factor analysis, etc., have received considerable archaeological attention. The second approach assumes types are created by the archaeologist to order the data. The tools appropriate in this context, pattern classification techniques, have received scant archaeological attention. This paper presents the results of experiments with pattern classification techniques and assesses their archaeological potential. A methodology that incorporates both sides of the typological coin is also examined. (15)

Westfall, Deborah (see Davidson, H. M.) (12)

Whalen, Michael E. (Texas-El Paso) SOCIAL-ORGANIZATIONAL IMPLICATIONS OF HOUSEHOLD DISTRIBUTION IN A LATE MOGOLLON PITHOUSE VILLAGE. Communities are seen as frameworks of spaces and boundaries reflecting the sets of internal categories upon which social organization is founded. The distribution of household units in a late Mogollon pithouse village is analyzed within this perspective. The result is identification of a trend toward increasing size and formalization of definition of society's component residential units from early to late pithouse times. It is suggested that this arrangement is a logical precursor to the succeeding pueblo organization. (45)

White, Bruce (see Freimuth, G.) (43)

Whitley, David (UCLA) DISTANCE, DIRECTION AND SPATIAL ORGANIZATION IN NORTHERN BELIZE. This paper outlines the methodology and results of an initial study of the prehistoric settlement pattern in northern Belize. A demographic proxy variable is used to rank all sites hierarchically. Sites are then grouped within hierarchical levels, and distance and directional statistics are utilized to provide a two-dimensional description of these clusters. The spatial characteristics of paired hierarchical distributions are compared in an attempt to infer the spatial organizational patterns between sites of varying sizes. Initial results show these methods to be very useful, but suggest that regularities in spatial patterning are more highly developed in certain hierarchical levels than in others. (27)

Whittaker, John (see Kosakowsky, L.) (25)

Wilk, Richard R. (see Kosakowsky, L.) (25)

Wilke, Philip J. (California-Riverside) THE "ANCIENT STONE FISH TRAPS" OF THE SALTON BASIN, CALIFORNIA. For nearly 70 years anthropologists have speculated on the significance of certain rock constructions in the Salton Basin, southeastern California. These structures have variously been interpreted as fish traps, house remains, pueblod ruins, and hunting blinds. They number in the thousands and are widely distributed in the basin. Field studies have shown that they were built in annual construction episodes during the last recession of Lake Cahuilla, about 1500 A.D., and are probably a specialized type of fishing weir similar to those used on the Lower Colorado River in historic times. (5)

Williams-Dean, Glenna (Texas A & M) DAILY LIFE OF PREHISTORIC MAN IN THE LOWER PECOS REGION OF TEXAS. Analysis of a large sample of prehistoric human coprolites from a single depositional layer at Hinds Cave has been largely completed. The paleynological, parasitological, botanical, and other biological data together outline the requisites of human adaptation to the semi-arid environment in southwest Texas 6,000 years ago. Suggestions as to season and periodicity of human habitation of the rock-shelter at this time level, as well as methodological considerations, will be discussed. (28)

Wing, Elizabeth S. (Florida State Museum) MAYA FOODWAYS. The Maya area has been called the land of deer and turkey. Through the identification and analysis of animal remains excavated from Maya sites we may examine how well this typifies Maya subsistence. The work of Pollack and Ray and Pohl indicate that deer and turkey were indeed prime resources of inland Maya sites. Study of faunal remains from Maya sites located along the coastal and lower reaches of rivers show evidence of use of aquatic resources as well as terrestrial ones. This paper will examine some of the evidence that is now coming to light on Maya fishing. (3)

Winter, Marcus (INAH) ARCHAEOLOGY OF THE OTOMANGUEAN AREA. Linguistic prehistory suggests the Tehuacan Valley as the cradle of the Otomanguean language family, with subsequent diversification and expansion throughout Mesoamerica. Archaeological data suggest the emergence of regionally distinct social formations, correlating with distinct linguistic and ethnic groups. Recent archaeological investigations in Oaxaca—the area of greatest diversity of Otomanguean languages—suggest a probable correlation between the sequence of diversification of linguistic groups and major changes such as the widespread appearance of sedentary villages and social stratification. Regional patterns at different periods are described, with possible explanations for the emergence of linguistic and socio-political diversity in the area. (49)

Wiseman, Frederick M. (LSU) THE TERMINAL CLASSIC MAIZE EPISODE. A distinct minor peak of *Zea* pollen occurs immediately below the stratigraphic change from the "disturbed" to "climax" pollen floras in several cores from the Maya Lowlands. Technical, epistemological, and statistical methods yield data that indicate that the Maize Episode is not a function of statistical or sampling error. Implications of the potential ecological significance and stratigraphic position of the episode are that within the watersheds of at least three basins, maize monoculture may have replaced a previous diversified agriculture during the Terminal Classic Period. Such an implication may either reflect the internal turmoil accompanying, or be a minor cause of, the Maya collapse. (10)

Wolfman, Daniel (Arkansas Archeological Survey) RECENT ARCHAEMAGNETIC RESULTS FROM ARKANSAS. Recent archaeomagnetic results suggest that the tree-ring calibrated polar curve for the time period 1200-1500 A.D. developed in the southwest can also be used to date samples collected in Arkansas and border areas of adjacent states. A brief discussion of this dating method and the results obtained will be presented. (6)

Wolynec, Renata B. (Edinboro State College) ARCHAEOLOGICAL FEATURES AND INFORMATION. The relationship between features in cultural context and features in archaeological context is conceptualized by applying concepts from Information Theory. This conceptual framework examines the nature of information about human behaviors encoded in cultural context and how this information is encoded in patterns of organization manifested in an archaeological feature population. The applications of this conceptual framework to the analysis of Middle Archaic archaeological features excavated from the Koster Site are examined with emphasis upon generating inferential models as a means by which human behaviors can be inferred from spatially related patterns of feature organization. (6)

Wood, J. Scott (USDA Forest Service) THE SALT RIVER RECREATION PLAN: CULTURAL RESOURCE AND LAND USE MANAGEMENT IN THE TONTO NATIONAL FOREST, ARIZONA. This paper discusses the archaeological aspects of a long term land management program for the Salt River Recreation Area on the Tonto National Forest, Arizona. Archaeological input into the

pre-planning or evaluative stage of management programs is emphasized. This process involves the inventory and assessment of cultural properties, evaluation of impacts, and formulation of management plans compatible with multiple and dominant uses. Objectives are seen as providing protection for both cultural and natural resources. Pre-planning evaluative input is seen as the most effective method for long range management and protection of cultural resources. (24)

Wood, J. Scott (see McAllister, Martin E.) (8)

Woods, William J. (SIU-Edwardsville) FIELD TUNNEL EROSION—A MESOAMERICAN EXAMPLE. Evidence of dramatic site alteration by a distinctive subsurface erosional process was observed during the 1975 Puebla Preclassic Project. Termed field tunnel erosion, or piping, this phenomenon has been previously reported for a variety of non-site arid and semiarid locales. In site contexts, the process can result in both the selective removal of subsurface cultural horizons and *in situ* artifact modification. The archaeological significance of field tunnel erosion is discussed utilizing an example from the Puebla Valley. (40)

Word, James H. (Texas Archeological Society) THE CONSERVING AMATEUR EVALUATES PROFESSIONAL ARCHAEOLOGY. The amateur or avocational archaeologist must assume an attitude of responsibility by working with professional archaeologists and the general public to insure the protection of information contained in archaeological sites. Many times this necessary situation requires the amateur to go an additional mile to help the professional archaeologist inform the interested citizenry about the whys, hows, and the results of investigations. Suggestions are offered about how the vocational archaeologist can better integrate with the people who support archaeology. (18)

Wyckoff, Lydia L. (Yale) SOUTHWESTERN NICARAGUA: A STUDY OF CHANGE. An analysis of faunal and molluscoid remains found in association with Middle and Late Polychrome Period artifacts will be presented as it provides information as to the subsistence practices during these periods. Furthermore, it will be noted that the faunal and molluscoid remains are in inverse proportions during these two periods with the greatest quantity of faunal remains associated with the Late Polychrome Period. It is hypothesized that this pattern is the result of environmental and cultural change. (32)

Yesner, David R. (Maine) CARIBOU EXPLOITATION IN INTERIOR ALASKA: PALEOECOLOGY OF THE PAXSON LAKE SITE. Study of caribou exploitation sites is relevant to understanding: (1) traditional subarctic hunting patterns, (2) response of hunter-gatherers to changing game migration patterns, (3) efficient use of the tundra-forest ecotone, and (4) Upper Paleolithic megafaunal exploitation, particularly with reference to caribou. To this end, detailed faunal analysis is undertaken from the Paxson Lake site in interior Alaska. Dental eruption sequences indicate fall-winter site usage conforming to present availability of the Nelchina herd. Dental wear patterns indicate unexpected concentration of older caribou. These data suggest primary site usage for clothing fabrication, confirmed by an *in situ* bone awl production sequence. (47)

Young, D. (see Clark, G. A.) (34)