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Program and Abstracts

SOCIETY FOR
AMERICAN ARCHAEOLOGY

THIRTY-EIGHTH ANNUAL MEETING

San Francisco, California

3, 4, 5 May 1973

**The James A. Ford
Library of Anthropology**



**Florida Museum of Natural History,
Anthropology Division**



Gift of: Dr. Kathleen A. Deagan

<i>President:</i>	Charles C. Di Peso
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GENERAL INFORMATION

Registration A registration desk will be located in the French Parlor on the hotel's second floor from 5 p.m. to 9 p.m. on Wednesday, 2 May; 8 a.m. to 4 p.m. Thursday and Friday; and 8 a.m. to noon on Saturday. Registration includes a copy of the Program and Abstracts.

Advance Registration Members who pre-registered through the SAA executive office by 10 April should claim their badges and programs at the ADVANCE registration desk in the French Parlor.

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 next to the advance registration.

Membership Services and Publications A desk will be maintained from 5 p.m. to 9 p.m. on Wednesday, 8 a.m. to 4 p.m. Thursday and Friday, and 8 a.m. to noon Saturday in the French Parlor for those who wish to purchase publications or enroll in the Society.

Business Meeting The Society's annual business meeting will be held at 5 p.m. Friday, 4 May, in the Rose Room.

Open House A cash bar reception to which everyone is invited will be held from 6 p.m. to 8 p.m., Thursday, 3 May, in the Rose Room.

Luncheons Tickets for Archaeology in the Round, which will be held on Friday at noon in the Regency Room, may be purchased at the Advance Registration desk. Attendance is limited, and it is recommended that reservations be made early.

Lounge and Snack Bar The Royal Suite, on the second floor, has been set aside as an informal meeting place from 9 a.m. to 5 p.m., Thursday through Saturday. Sandwiches and beverages may be purchased from a snack bar which will be open in the Royal Suite from 10 a.m. to 6 p.m., Thursday through Saturday.

Program Committee Members of the Committee will be available in the Sierra Room.

Message Center A self service message center will be located in the French Parlor throughout the meeting. Please check the board frequently.

Exhibits Publishers' exhibits will be on display in the lower lobby of the French Parlor from 5 p.m. to 9 p.m. on Wednesday, and 9 a.m. to 5 p.m. Thursday, Friday, and Saturday. Participating exhibitors include American University Press Services, Seminar Press, University of Texas Press, and Warner Modular Publications.

Baby Sitting A baby sitting service is available through the Bristol Agency at 776-9100.

Directory of Hotel Restaurants and Lounges

Garden Court: main dining room, 7 a.m. to 9:30 p.m.

Tudor Room: cocktails and dinner-dancing, 11:45 a.m. to 2 a.m.

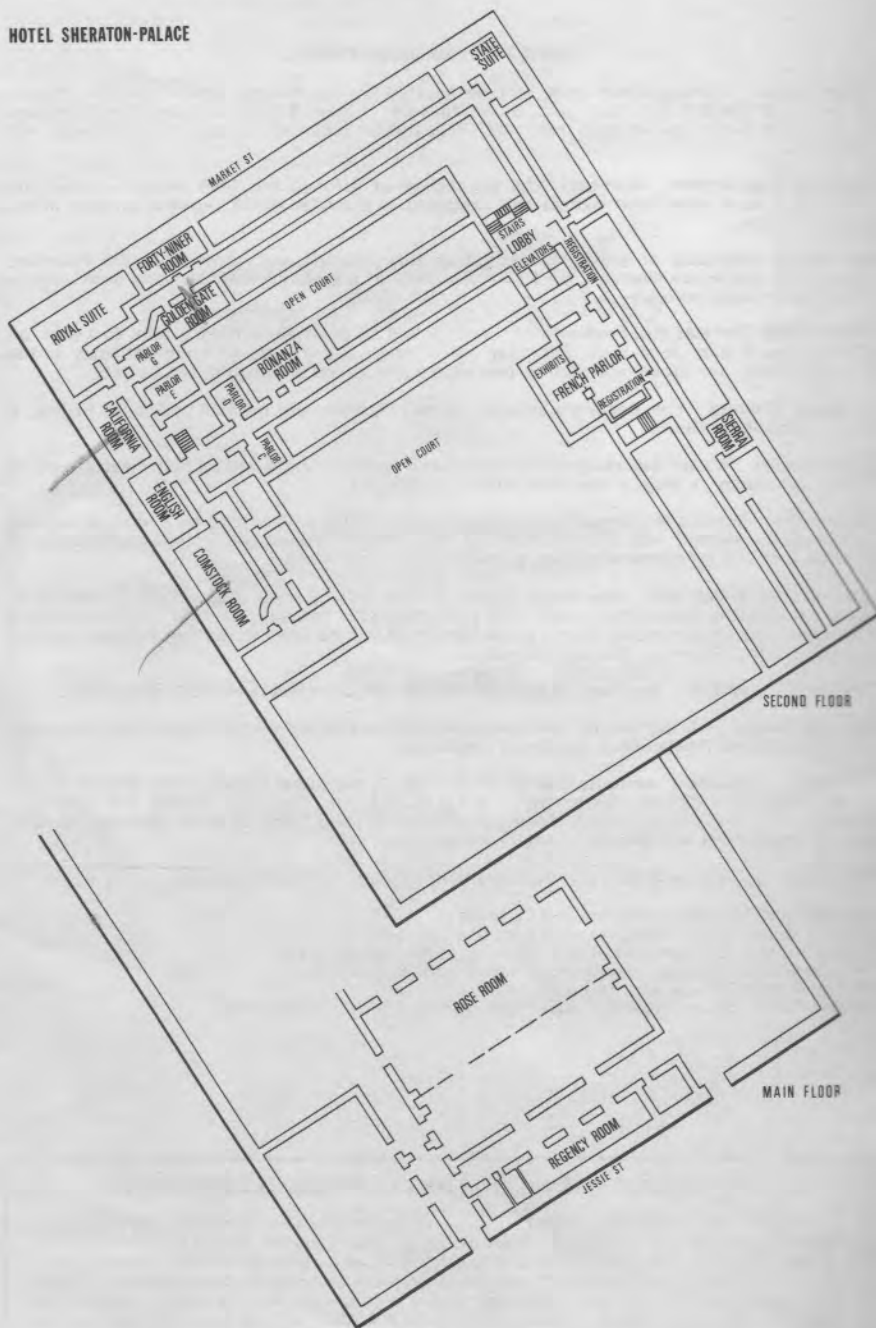
Minute Chef: breakfast, luncheon, dinner, 7 a.m. to midnight

Happy Valley Bar: 11 a.m. to 1 a.m.

Blum's Coffee Shop: breakfast, luncheon, dinner, 7 a.m. to 8:30 p.m.

NOTE TO PARTICIPANTS FROM THE PROGRAM COMMITTEE

It would appear that this year's meeting is going to be an exceptionally exciting, intellectually stimulating, and large meeting. This program reflects our efforts to schedule with a minimum of theoretical, regional, and personal conflicts, the sessions and symposia. The final program contains corrections from the large amount of mail we have received. The SAA has developed a large number of guidelines for the Society's meetings. We felt it was neither our role, nor did we have the resources to act as policemen, but we wish to thank the large number of participants who followed these guidelines. We hope you enjoy the meetings and San Francisco.



PROGRAM

THURSDAY MORNING, 3 MAY

(1) Symposium: ECOLOGICAL ANTHROPOLOGY

- 8:30- Rose Room
Organizers and Chaired by: Olga S. Puleston, Richard Blanton
- 12:00 Participants:
Daniel Bates, Production and Population Among Nomadic Herders
William Irons, Social Convention and Population Dynamics Among the Yomut
Turkmen of Northern Persia
Susan Lees, Irrigation, Ecological Feedback, and Political Development
Richard Blanton, A Systemic Approach to the Relationship Between Population
Growth and Socio-Cultural Change
Robert Sussman, Preagricultural Mobility—A Factor Limiting Growth in Human
Populations
Thomas C. Greaves, The Ecology of Uncertainty: Response to a Disastrous Flood
by an Agrarian Andean Community
Claire Cassidy, Nutritional Differences Between Hunting-Gathering and Settled
Agricultural Populations in the Eastern Woodland Region of North America
Ellen Messer, Sown and Unsown Aspects of Productivity in Agricultural Systems
in the Valley of Oaxaca, Mexico
Olga Puleston, Cultural Variability as an Adaptive Factor in the Lowland Maya
Area
Dennis Puleston, The Manipulation of Environmental Variables by Human
Populations and Significance Thresholds
Daniel Gross, Carrying Capacity and Population Dynamics in the Amazon
Basin—An Alternative View

(2) Symposium: LITHIC TECHNOLOGY SYMPOSIUM: DEBITAGE ANALYSIS

- 8:30- Bonanza Room
Organizer and Chaired by: Harry J. Shafer
- 12:00 Participants:
Michael B. Collins, Ethnography and Experimentation in the Study of Archae-
ological Lithic Debitage
Payson D. Sheets, The Two Chipped Stone Industries of Barriles, Western Panama
Harry J. Shafer, Debitage Analysis and Reduction Systems at the George C. Davis
Site, Texas
Paul R. Katz, The Lithic Technology of a Ceramic Complex
Carl J. Phagan, Lithic Debitage Analysis, the Ayacucho Valley, Peru
Guy Muto, Attributes of Technology vs. Artifacts of Culture
Barbara A. Purdy, The Arrowhead Factory Site (Mr 122), Marion County, Florida
George C. Frison, Practical Considerations in the Analysis of Tool Use
Daniel Stiles, Assessment of Similarities and Dissimilarities in Lithic Assemblages:
MNK Chert Factory Site and HWK East at Olduvai Gorge, Tanzania
Kenneth D. Williamson, Edge Damage to Unmodified Stone Flakes: A Quantita-
tive Approach

(3) Symposium: DATA BANK AND RELATED USES OF COMPUTERS IN ARCHAEOLOGY

- 9:00- Regency Room
Organizer and Chaired by: Frank B. Fryman, Jr.
- 12:00 Participants:
Frank B. Fryman, Jr., Data Banks on the State Level with Proposed Federal
Coordination of Various Programs
Sylvia W. Gaines, A Pragmatic Approach to Archaeological Data Banks
Charles W. McNett, Jr., Regional Data Banks for Cooperative Research: The
Potomac River Example
James A. Brown, An Application of a Specialized Data Bank for Analysis and
Information Retrieved in the Field
Dee F. Green, Data Banks and Specific Research Design: The SARG Example
Sandra Scholtz and Robert G. Chenhall, Networks of Archaeological Data Banks
Cynthia Irwin-Williams and Paddy Clarke, The Development of a System of Data
Recording, Storage, and Retrieval for the San Juan Valley Archaeological
Program
George L. Cowgill, Data Banks and Statistical Analysis
Discussant: Robert G. Chenhall

(4) Symposium: HOLOCENE CLIMATIC CHANGE IN THE GREAT BASIN: PRE-SENTATION OF REGIONAL SEQUENCES

English Room

- 9:00- Organizers: Don Fowler, Robert Elston
 12:00- Chaired by: Robert Elston
 Participants:
 Roger B. Morrison, Holocene Geological Climatic Record in the Great Basin and Implications for Future
 Jonathan O. Davis and Robert Elston, Geological and Pedologic Chronology of Archaeological Sites in Northwest Nevada
 K. T. Harper, Climates of the Last 10,000 Years in the Northeastern Great Basin as Inferred from Cultural Deposits in Caves
 B. W. Butler, Late Glacial and Post Glacial Fluctuations in the Carrying Capacity of the Sage Brush-Grass Region of Eastern Idaho
 Donald K. Grayson, The Nightfire Island Avifauna and the Altithermal
 Discussants: Don Fowler, Herald E. Killeforth, Vance Haynes

(5) General Session: MESOAMERICAN CERAMIC ANALYSIS

- Comstock Room
 Chaired by: T. Patrick Culbert
 Participants:
 9:00 T. Patrick Culbert, Vessel Shape in Ceramic Analysis
 9:20 Jacinto Quirarte, Izapan and Mayan Traits in Teotihuacan III Pottery
 9:40 Lawrence Feldman and L. R. V. Joesink-Mandeville, An Ethnohistoric Restoration of "Aztec" III and IV Pottery
 10:00 Noemi Castillo-Tejero, The So-Called "Mixtec Polychrome" Ware is not a Mixtec Product
 10:20 L. R. V. Joesink-Mandeville, Mani Pattern Burnished Ware in the Middle Formative: Reassessment of Brainerd's Mani Cenote Collection in Light of his Field Notes
 10:40 Robert E. Fry and Scott C. Cox, Late Classic Pottery Manufacture and Distribution at Tikal, Guatemala
 11:00 Nicholas M. Hellmuth, Teotihuacan-Cotzumalhuada-Veracruz Art in Escuintla, Guatemala
 11:20 Michael J. Snarskis, Pilot Study of Ceramics from Cerro Chivo, Acamba: A New Site in Western Mexico

(6) Panel Discussions: ARCHAEOLOGY IN THE 70'S—MITIGATING THE IMPACT
 California Room

- 9:00- Organizer: Carl Chapman
 12:00 Panel #1: Archaeology and the Law
 Chaired by: Charles R. McGimsey III
 Participants:
 Charles R. McGimsey III, A Review of Federal Legislation—What It Does and Does Not Require Relevant to Archaeological Resources
 Jon Young, Executive Order 11593
 Rep. of the U.S. Army Corps of Engineers, Federal Legislation from the View of a Federal Agency
 James J. Hester, John Music, and Marvin Wolf, Questions and Answers on What is Legal and What is Possible at the State and Local Level in Preserving and Protecting Archaeological Resources
 Panel #2: Approaches to Mitigating the Impact of Recent Archaeological Legislation on Archaeological Resources and on Archaeologists
 Moderator: Hester A. Davis
 Participants:
 Tom King, California's Approach to State and Federal Laws
 L. Ross Morrell, Florida's Approach to State and Federal Laws
 Martha Potter Otto, Approaches to Environmental Impact Statements Discussed by Agencies and Archaeologists at Fayetteville, Arkansas, April, 1973
 David S. Dibble, Approaches to Determining Cost in Preparing Archaeological Information for Environment Impact Statements
 Panel #3
 Moderator: Rex Wilson
 Participants: Ray Thompson, Bill Haag, Mike Fowler, Don Lehmer, Curtis Tunnell, Marian White, Mike Morato

(7) General Session: NORTH BY NORTHWEST

- Golden Gate Room
 Chaired by: Edwin S. Hall
 Participants:
 9:00 Edwin S. Hall, Jr., and Robert A. McKennan, An Archaeological Survey of Old John Lake Area, Northern Alaska
 9:20 Robert E. Ackerman, A Macrocore and Flake Industry in Southeastern Alaska (circa 8200-3700 B.P.)
 9:40 Robert F. Black, Late Quaternary Geomorphic Events Related to Paleo-Aleut, Umnak Island, Alaska
 10:00 Jean S. Aigner and Douglas Veltre, Uman Burials from Southwestern Umnak Island, Alaska

- 10:20 W. S. Laughlin, A. B. Harper, and S. B. Laughlin, Sea, Level, Stratigraphy, and Radiocarbon Dating of the Anagula Unifacial Industry: 8400-7600 B.P.
 10:40 William B. Workman, Dated Traces of Early Holocene Man in Southwest Yukon, Canada
 11:00 W. N. Irving, Stone Implements from Old Crow Flats, Y.T.
 11:20 Kathryn E. Sargeant, Redfish Overhang: A Surprising Haskett Site in a Glacial Coniferous Setting of Central Idaho
 11:40 Ann Monseth-Irwin et al., Roald Fryxell, Carl Gustafson, Henry Irwin, and Guy Muto, Interdisciplinary Investigations at the Lind Couler Site, Grant County, Washington
 12:00 Ed Clewett, A Preliminary Report on an Early Archaic Site in Northern California
 Discussion

(8) Symposium: CULTURAL ECONOMICS AND ANTHROPOLOGICAL ARCHAEOLOGY

- Forty-Niner Room
 9:00- Organizer and Chaired by: Arthur Saxe
 12:00 Participants:
 Arthur Saxe, Cultural Economics and Anthropological Archaeology
 Jane Wheeler Pires-Ferreira, Exchange Systems in Formative Mesoamerica
 Lou Binford, Minimizing Labor in Response to Stress
 Darryl Maddox, Testing Economic Hypotheses in Archaeology
 Discussant: Kent Flannery

THURSDAY AFTERNOON, 3 MAY

(9) Symposium: THE GREAT AMERICAN DREAM MACHINE: ARCHAEOLOGISTS IN THE WORKS

- Rose Room
 2:00- Organizers and Chaired by: William L. Rathje, J. Jefferson Reid, Michael B. Schiffer
 5:00 Participants:
 J. Jefferson Reid, The Archaeologist at Work: Past and Present
 Robert L. Schuyler, Pre- and Post- Industrial Society and Archaeology as the Science of Material Culture
 Mark P. Leone, Material Culture in American Utopias
 Daniel W. Ingersoll, The Ashman Cometh
 Michael B. Schiffer, Undergraduate Contributions to Modern Material Culture Studies
 James E. Ayres, Beef and Booze I: Demography of Food Consumption in An Urban Environment, 1870-1900
 Frederick Gorman and William L. Rathje, Beef and Booze II: Demography of Current Food Consumption in an Urban Environment
 William L. Rathje and Frederick Gorman, The Garbage Project: Oscar as Archaeologist
 Donald E. McVicker, Pots—Past and Present
 Discussant: Raymond H. Thompson

(10) Symposium: ISLAND ADAPTATION: CURRENT RESEARCH IN HAWAIIAN ARCHAEOLOGY

- Bonanza Room
 1:00- Chaired by: H. David Tuggle, William K. Kikuchi
 5:00 Participants:
 William K. Kikuchi, Prehistoric Hawaiian Aquaculture
 H. David Tuggle, Introductory Remarks and Models of Agricultural Growth in Island Environments
 Patrick V. Kirch, Early Settlement and Problems of Adaptation in Hawaii
 Farley Watanabe, Varieties of Irrigation Complexes in Winward Kohala, Hawaii
 Timothy K. Earle, Hawaiian Irrigation in the Halelea District, Kauai
 Dennis Callan, Settlement Patterns in Hawaiian Valley Environments
 Kenneth Moore, Natural Environments and Social Boundaries in Hawaii
 Ed J. Ladd, Archaeology in Arid Environments: National Park Service Archaeology in the Fiftieth State
 Paul Rosendahl, Aboriginal Agriculture and Residence in Upland Lapakahi, Island of Hawaii
 Michael Kaschko, Trail Systems and Boundaries in Leeward Kohala, Island of Hawaii
 Thomas J. Riley, Agricultural Archaeology in Hawaii: Problems and Prospects
 Robert J. Hommon, Archaeology and the Primitive State: The Hawaiian Example
 Discussants: Ezra Zubrow, Edwin N. Ferdon, Dick Ford

(11) Symposium: ARCHAEOLOGY AND EDUCATION

- Regency Room
 2:00- Organizers and Chaired by: Lilita Bergs, John M. Hartman
 5:00 Participants:
 Hester Davis, Training Amateur Archaeologists and Public Relations

John Cotter, Public Education in Archaeology and Training the Pre-College Student
 Raymond H. Thompson, Participation of American Indians in Archaeological Research
 Indiana State Museum, Public Education and the Museum Shop
 Lilita Bergs, A Survey of Alternate Methods for Teaching Field Techniques
 Discussants: Raymond Baby, Bettye J. Broyles

(12) Symposium: HOLOCENE CLIMATIC CHANGE IN THE GREAT BASIN: CORRELATION OF REGIONAL SEQUENCES AND REEVALUATION OF PREVIOUS CLIMATIC MODELS

English Room
 2:00- Organizers: Robert Elston, Don D. Fowler
 5:00- Chaired by: Robert Elston
 Participants:
 James A. Young, Raymond A. Evans, and Paul T. Tueller, Great Basin Plant Communities—Pristine and Grazed
 Don D. Fowler and Harold Klieforth, Holocene Climatic Change in the Great Basin
 Peter Mehringer, Claude M. Warren, and Austin Lang, Dune Chronology, Occupation, and Resources, Amargosa Desert, Nevada
 David B. Madsen, Pluvial-Post Pluvial Vegetation Changes in the Southeastern Great Basin
 G. F. Fry and J. M. Adovasio, Human Adaptation During the Aitithermal in the Eastern Great Basin
 Discussants: Don D. Fowler, Vance C. Haynes, Harold E. Klieforth, James A. Young

(13) General Session: SETTLEMENT PATTERNS AND ARCHITECTURE IN MESO-AMERICA

Comstock Room
 Chaired by: James A. Neely
 Participants:
 2:00 Robert E. Greengo, Settlement Pattern Survey in Northeastern Guerrero, Mexico
 2:20 Prentice M. Thomas, Settlement Pattern Survey at Becan, Campeche, Mexico
 2:40 Melvin L. Fowler, The Late Preclassic of the Valley of Puebla; Settlement Systems, Land Use, and Urbanism
 3:00 James A. Neely and Michael J. O'Brien, Irrigation and Settlement Nucleations at Monte Alban: A Test of Models
 3:20 David F. Potter and Joseph W. Ball, Preclassic Architecture at Becan, Campeche, Mexico
 3:40 Rosemary Sharp, Architecture as Inter-Elite Communications in Pre-Conquest Veracruz, Oaxaca, and Yucatan
 4:00 David S. Hyman, Prehispanic Mesoamerican Cements
 4:20 Dwight T. Wallace and Robert M. Carmack, Style and State in Peru—A Suggested Structuralist Approach
 Discussion

(14) Symposium: FEDERAL ARCHAEOLOGY: THE PUBLIC WORKS PROJECT OF THE DEPRESSION YEARS

California Room
 2:00- Organizer: Ernestine S. Elster
 5:00- Chaired by: James B. Griffin
 Participants:
 Ernestine S. Elster, Why Look Backward?
 James B. Griffin, A Review of the Significance of Federal Programs in Archaeology
 Preston Holder, Have Spade, Will Travel: The Archaeologist as Migratory Worker
 Jesse D. Jennings, Public Works Archaeology in the Southeastern United States, 1933-1941
 Franklin Fenenga, Public Works Archaeology in California and Nevada
 William G. Haag, The Tennessee Valley Authority Archaeological Program
 Stuart Struever, Modern Archaeological Research Strategies Through the Perspective of W.P.A. Archaeology
 Discussants: Douglas Osborne, John L. Cotter, Arthur Kelly

(15) Symposium/General Session: PALEO-INDIANS IN THE GREATER SOUTHWEST

Golden Gate Room
 Chaired by: Emma Lou Davis
 2:00- Participants:
 5:00- Emma Lou Davis, Hunting, Work, and Living Practices of Early Americans
 Alan C. Ziegler, Richard H. Brooks, and Sheilaigh Brooks, Early Faunal and Cultural Correlations
 Frank J. Findlow, Suzanne P. DeAtley, and Jonathan Ericson, A Tentative Hydration Rate for the Obsidian from the Borax Lake Obsidian Source
 George T. Jefferson, A Reexamination of the Pinto Basin Site

William S. Glennan, The Baker Site—An Early Lithic Assemblage from the Mojave Desert
 Donald R. Tuohy, A Comparative of Late Paleo-Indian Manifestations in the Western Great Basin
 Louis A. Payen, Crevis Creek: New Light on the Farmington Complex
 Frank E. Hibben, Paleo-Indian and Desert Archaic Manifestations at Comanche Springs, New Mexico

(16) Symposium: ONGOING RESEARCH IN WESTERN SOUTH AMERICAN PRE-HISTORY

Forty-Niner Room
 2:00- Organizers and Chaired by: Peter M. Jensen, Robert R. Kautz
 5:00- Participants:
 E. M. Moseley, Labor Organization in Large Scale Construction Projects
 Carol J. Mackey, Diffusion and Invasion in the Moche Valley, Peru
 D. L. True, Archaeological Investigations in Northern Chile: Project Tarapaca
 Robert R. Kautz, Pollen from Human Coprolites in Northern Chile
 Harvey Crew, Examination of the Lithic Manufacturing Methods and Techniques from Tarapaca 2A: Provisional Results and Future Utility
 Dwight Simons, Faunal Remains from Northern Chile
 Peter M. Jensen, Formal Analysis of the Leaf-Shaped Point in Early American Prehistory
 Discussants: D. L. True, E. M. Moseley, Thomas F. Lynch, Christopher B. Donnan

NATIONAL INVENTORY AND RESOURCES

2:00- Parlor G
 5:00 Meeting

THURSDAY EVENING, 3 MAY

OPEN HOUSE

6:00- Rose Room
 8:00 No Host Bar

SOCIETY FOR CALIFORNIA ARCHAEOLOGY

7:30 Comstock Room
 Business Meeting

FRIDAY MORNING, 4 MAY

(17) General Session: GENERAL THEORY AND ETHNO-ARCHAEOLOGY

Rose Room
 Chaired by: Walter W. Taylor
 Participants:
 9:00 Robert C. Dunnell, The Normative Straw Man: An Oblique Defense?
 9:20 Walter W. Taylor, Archaeological Typology and Paleo-Psychology: A Reply
 9:40 C. William Clewlow, Jr., Paleo-Indian Prehistory and the Origin of Language
 10:00 Margaret Kimball Brown, The Application of a General Systems Model to the Study of Culture Change
 10:20 Richard A. Gould, Continuous and Discontinuous Models in Ethno-Archaeology
 10:40 Bion P. Griffin, Hunters in the Humid Tropics: Ethno-Archaeology of Ebukid Agta
 11:00 Michael B. Stanislawski, Ethno-Archaeology and Settlement Archaeology
 Discussion

(18) General Session: INTERPRETATIONS OF SOCIAL AND DOMESTIC ACTIVITIES

Bonanza Room
 Chaired by: William Longacre
 Participants:
 9:00 Jerry V. Jermann, A Consideration of Computer Methods in the Study of Prehistoric Community Pattern Structure
 9:20 Richard S. Ciolek-Torrello and J. Jefferson Reid, Prehistoric Social Change: A Southwestern Case
 9:40 Meade Kemrer, The Developmental Cycle of Domestic Groups in a Prehistoric Pueblo Community
 10:00 James T. Rock, The Construction Unit in a Prehistoric Pueblo
 10:20 Michael D. Mauer, Structural Analysis of High Status Burials from the Prehistoric Southwest
 10:40 Patrick C. McCoy, The Household Unit in the Easter Island Settlement Pattern
 11:00 Frederick W. Lange, Slave Mortuary Practices on Barbados
 11:20 Carole L. Crumley, An Exercise in Paleo-Ethnography
 11:40 Stanley Olsen, Introduction of Domestic Animals into the Southwest

FILMS

8:30 Regency Room
A. R. Blukis-Onat, The Survey
9:00 Douglas Schwartz, In Search of Grand Canyon Past

(19) Symposium: HISTORIC INDIANS OF FLORIDA AND SOUTHEASTERN GEORGIA: ETHNO-HISTORICAL ARCHAEOLOGICAL CORRELATIONS

Golden Gate Room
8:30- Organizer: Jerald T. Milanich
12:00 Chaired by: Charles H. Fairbanks
Participants:
Hale G. Smith and Mark Gottlob, Spanish-Indian Relationships in Southeastern Georgia and Florida
Father Clifford M. Lewis, The Calusa
Ripley P. Bullen, The Tocobaga Indians and the Safety Harbor Culture
Jerald T. Milanich, The Western Timucua: Patterns of Acculturation and Change
Kathleen A. Deagan, Ethnic Continuity in Florida: The Eastern Timucua and Their Predecessors
R. T. Zuidema, Timucua Kinship and Social Organization
Louis H. Larson, Jr., The Guale: Acculturation on the Georgia Coast During the Sixteenth Century
L. Ross Morrell and B. Calvin Jones, The Apalachee
Charles H. Fairbanks, Archaeology of the Seminole
Samuel Proctor, The University of Florida Southeast Indian Oral History Project

(20) Symposium: FUNCTIONAL ANALYSIS OF STONE TOOLS

English Room
9:00- Organizer and Chaired by: Ruth Tringham
12:00 Participants:
David H. Thomas, Microwear Studies on Some Ethnographic North American Hafted Stone Tools: Preliminary Findings
John Weymouth and Marnie Mandeville, X-Ray Diffraction Analysis of Heat Treated Chert
Clay A. Singer, Selected Comments on the Analysis of Mesoamerican Obsidian Blade Assemblages

(21) Symposium: PREHISTORIC RAW MATERIAL TRADE AND ARCHAEO-ECONOMIC PROCESSES

Comstock Room
8:30- Organizers: Jonathon Ericson, Clement W. Meighan
12:00 Chaired by: Clement W. Meighan
Participants:
Phillip C. Weigand, Garman Harbottle, and Edward V. Sayre, Trade Patterns for Turquoise in Mesoamerica and Southwestern United States
Raymond Sidrys, Trade Indices for Utilitarian Imports of the Classic Maya
Judith G. Connor and William L. Rathje, Mass Production and the Ancient Maya: Experiments in Cracking Maya Pots
Fred Plog, Models of Economic Organization and Exchange
Clifford G. Hickey, Input-Output (Inter-Industry) Economics of Archaeological Systems
Cynthia Irwin-Williams, Models for the Analysis of Prehistoric Trade Patterns
Colin Renfrew, The Law of Monotonic Decrement
Robert N. Jack, The Sources and Prehistoric Dispersal of Obsidian in Northern and Central California
Jonathon E. Ericson, Prehistoric Trade in California—A Preliminary Study
James B. Griffin, The Source of Hopewellian Obsidian and its Dispersal Pattern in the Middle Woodland Sites

(22) Symposium: NARRATIVE SCENES IN MESOAMERICAN ART: A SOCIO-CULTURAL PERSPECTIVE

Forty-Niner Room
9:00- Organizer and Chaired by: Charles Cheek
12:00 Participants:
Charles Cheek, The Study of Narrative Scenes in Mesoamerican Art—An Olmex Example
Joyce P. Marcus, Regional Dress Patterns of Classic Maya Women
David H. Kelley, Costume and Name in Mesoamerica
John Mollay, Hugh G. Ball, and William B. Kessell, The Codex Nuttall: Universal Epic or Narrow Nationalism
R. E. W. Adams, Fine Orange Pottery as a Source of Ethnological Information
Discussant: Robert Rands

FRIDAY MORNING AND AFTERNOON, 4 MAY

(28) Symposium/General Session: SAMPLING IN ARCHAEOLOGY

California Room
A.M.- Organizer and Chaired by: James W. Mueller
P.M. Participants:
Robert G. Chenhall, A Rationale for Archaeological Sampling
Michael B. Collins, The Sources of Bias in Processual Data: An Appraisal
Robert A. Benfer, Iterative Detection of Case and Variable
Dwight W. Read, Regional Sampling
David Hurst Thomas, The "How," "Why," and "Should-have-been" of Sampling in the Reese River Ecological Project
W. James Judge, James I. Ebert, and Robert K. Hitchcock, Transect Sampling in Regional Archaeological Survey
Richard G. Matson and William D. Lipe, Regional Sampling: A Case Study
Craig Morris, Sampling Problem in the Excavation of an Urban Site: The Case at Huanuco Pampa
James A. Brown, Deed Site Excavation Strategy as a Sampling Problem
James W. Mueller, Archaeological Research as Cluster Sampling
David L. Asch, Some Problems in Archaeological Sampling
Charles L. Redman, Productive Sampling Strategies for Archaeological Sites
Arthur H. Rohn, How Well We Sample Archaeological Sites
Edward B. Jelks, The Use and Misuse of Random Sampling in Archaeology
David R. Wilcox, Sampling Pueblos: The Problem of Comparability
Discussants: George Cowgill, Lewis Binford

FRIDAY AFTERNOON, 4 MAY

ARCHAEOLOGY IN THE ROUND: AN EXPERIMENTAL LUNCHEON

Regency Room
12:00- Informal discussion at tables for eight. Hosts are Lewis Binford, James Griffin,
2:00 James N. Hill, Raymond Thompson, Richard Woodbury

(23) General Session: SETTLEMENT PATTERNS AND ADAPTATIONS

Rose Room
Chaired by: Donald A. Graybill
Participants:
1:00 Robert Gibson, Monache Meadows and Cold Air Drainage—A Hypothesis
1:20 Frank W. Eddy, Pueblo Settlement Adaptations in the Upper San Juan Basin of New Mexico and Colorado, A.D. 1-1125
1:40 Glen Eugene Rice, Subsistence and Settlement Patterns of Early Masonry Hamlets—Mogollon Tradition
2:00 Donald A. Graybill, Prehistory and Locational Analysis in the Mimbres Region, New Mexico
2:20 Bruce Dickson, Locational Analysis of Prehistoric Settlement on the Duck River in Middle Tennessee
2:40 Jon Muller, Late Mississippian Settlement in the Kincaid Area
3:00 S. Alan Skinner, Burned Rock Middens and Prehistoric Settlement Patterns
3:20 William S. Dancy, Riverine Period Settlement and Land Use Pattern in the Priest Rapids Area, Central Washington
3:40 David R. Yesner, Aleutian Subsistence-Settlement Systems: The Southwest Umnak Focus
4:00 E. Gary Stickel and Rainer Berger, A Spatial and Chronological Analysis of Neolithic Settlements in the Alpine Foreland of Switzerland
Discussion

(24) Symposium: COMPUTER SIMULATION STUDIES IN ARCHAEOLOGY

Bonanza Room
2:00- Organizer and Chaired by: David H. Thomas
5:00 Participants:
A. J. Ammerman and L. L. Cavalli-Sforza, A Simulation Study of Bandkeramik Settlement Patterns
R. Bettarel and R. Schwartz, Demography and Early Man in the Americas: A Computer Simulation Model of Population Growth and Dispersal Relating to Man's Entry into the Americas
L. S. Cordell, Simulating Wetherill Mesa Settlement Pattern Changes: A Discussion of General Implications
T. E. Downing and H. A. Luebberman, Will Computer Simulations Improve Archaeological Theories?
C. Sheffer, Food Procurement in a Semi-arid Plain: A Programmed Model
D. H. Thomas, The Basin I Simulation Model: Toward Articulating Ethnological Theory with Archaeological Facts
H. M. Wobst, Neolithic Population, Settlement, and Activity Patterns
H. T. Wright and M. A. Zeder, The Simulation of Linear Reciprocal Trade System Under Equilibrium Conditions

Why wouldn't Ocala be Potomac and

20-25 for ante grades
8
new to use

E. B. W. Zubrow, The Simulation of Prehistoric Regional Systems
Edward Berger, Simulation Studies in the Social Sciences

- (25) General Session: ARCHAEOLOGY OF THE MIDDLE EAST
Regency Room
Chaired by: Arthur Jelinek
Participants:
3:00 Antonio Gilman, Approaches to the Study of the Neolithic of the Maghreb
3:20 Aileen G. Baron, Radiocarbon Dates from the Palestine Area
3:40 Arthur J. Jelinek, An Analysis of the Middle and Lower Paleolithic Industries from the Tabun Cave Excavation: Some Preliminary Results
4:00 Michael A. Hoffman, Archaeological Excavations at Hierakonopolis and the Rise of the Early Egyptian State Discussion

(26) General Session: ANALYSIS OF MATERIAL CULTURE METHODS AND INTERPRETATIONS

- English Room
Chaired by: J. M. Adovasio
Participants:
1:40 Thomas G. Cook, Structural Comparison of Artifact Collections: The Discovery of Behavior Sets Within Settlement Systems
2:00 Mary McCutcheon and Morgan J. Tamplin, Computer-Generated Keys for Ceramic and Lithic Typologies
2:20 Richard W. Keatinge, Chimu Ceramics from the Moche Valley, Peru: Attribute Analysis as a Basis for Seriating Domestic Pottery
2:40 Allison C. Paulsen, Similiary Seriation and the Type-Variety Concept: An Empirical Comparison of Two Methods of Ceramic Analysis
3:00 Michael D. Mauer and John P. Molloy, A Comparative Study of Four Southwestern Polychrome
3:20 William M. Hurley, Multivariate Analysis of Orr Focus Ceramics
3:40 Paula H. Krotser, Examples of the Use by an Archaeologist of Her Ethnographic Studies of the Technology and Sociology of Mexican Village Potters
4:00 Joanne M. Mack, Implications of "Shield Figures" from the Big Horn Mountains of Wyoming
4:20 J. M. Adovasio, The Evolution of Basketry in Prehistoric Mexico
4:40 Verla Birrell, Seven Independent Aspects of Color

(27) Symposium: THE RISE AND FALL OF THE CENTRAL MEXICAN CLASSIC
Comstock Room

- 1:00- Organizers and Chaired by: Joseph B. Mountjoy, Donald L. Brockington
5:00 Participants:
Donald L. Brockington, The Development of the Classic on the Oaxaca Coast
Richard A. Diehl, Tula and the Collapse of the Mesoamerican Classic
J. Charles Kelley and Ellen Abbott Kelley, The Rise and Fall of the Classic as Seen from the Northwestern Frontier of Mesoamerica
Jaime Litvak-King, The Rise and Fall of the Classic at Xochicalco
Joseph B. Mountjoy, The Collapse of the Classic at Chichula as Seen from Cerro Zapotecas
Richard E. Blanton and Dudley R. Varner, The Rise and Decline of the Classic in the Valley of Oaxaca
Jeffrey R. Parsons, The Rise and Decline of Classic Teotihuacan: Some Implications of Changing Regional Settlement Patterns in the Valley of Mexico
Evelyn C. Rattray, Ceramic Evidence on the Collapse of the Classic at Teotihuacan
Michael N. Spence, The Development of the Classic Period Teotihuacan Obsidian Industry
Warren Barbour, The Role of Religion in the Fall of Teotihuacan

(29) General Session: NEW PARAMETERS IN APPLIED ARCHAEOLOGY

- Golden Gate Room
Chaired by: Paul Schumacher
Participants:
2:00 George J. Gumerman, The Reconciliation of Theory and Method: The Role of Salvage Archaeology
2:20 Alexander J. Linsay, Jr., and R. Gwinn Vivian, Arizona Contract Archaeology: A Success, Why?
2:40 Jon Nathan Young, Inventory of Archaeological Resources and Entries into the National Registry of Historic Landmarks
3:00 Richard Brooks and Sheilaigh Brooks, Excavation by Request: Archaeological Recovery of Pioneer Burials
3:20 Martha I. Symes and George H. Abrams, Custer Died in Vain: The Archaeologist and the Indian Today Discussion

(38A) General Session: ARCHAEOLOGY: THE DISCIPLINE AND ITS VARIETY

- Forty-Niner Room
Chaired by: Christopher Drover
Participants:
9:40 Jean S. Aigner and Bruce Fullem, Sandy Beach Bay, a 4300-5600 B.P. Aleut Village
10:00 Christopher E. Drover, Early Ceramics from Coastal Southern California
10:20 Leslie B. Davis, The Twentieth Century Commercial Mining of Great Plains Bison Kills
10:40 Ray T. Matheny, The Moated "Fortress" of Edzna, Campeche, Mexico
11:00 Donald W. Forsyth, Ceramic Stratigraphy and Occupational Sequence at Edzna, Campeche, Mexico
11:20 Forrest Richard Hauck, The Preclassic Hydraulic Complex at Edzna, Campeche, Mexico
11:40 Larry D. Agenbroad, The Hudson-Meng Paleo-Indian Bison Kill, Northwestern Nebraska: An Analysis After Two Field Seasons

SATURDAY AFTERNOON, 5 MAY

(38B) Symposium: RECENT STUDIES OF CORE AND BLADE TECHNOLOGY

- Rose Room
Organizer and Chaired by: Thomas Roy Hester
Participants:
2:00- Don E. Crabtree, Experiments in Mesoamerican Core Preparation and Truncation Techniques
5:00- Jeremiah F. Epstein, Aztec Core-Blade Technology
Thomas R. Hester, Technological and Functional Analyses of Obsidian Artifacts from Southern Michoacan Mexico
Dan F. Morse, The Cahokia Microlith Industry
Guy R. Muto, Levallois Blades in the Old and New World
Jean Pitzer, A Microlithic Industry from the Channel Islands, California
Irwin Rovner, Technology and Typology of the Obsidian Industry at Mayapan
Alice W. Benfer, A Preliminary Lithic Analysis of Obsidian from Prehistoric Tula
Lawrence H. Feldman, A Tale of Two Stones: Flint and Obsidian in the Ethnohistory of Mesoamerica

(39) General Session: ARCHAEOLOGICAL METHODS

- Bonanza Room
Chaired by: Anta Montet-White
Participants:
2:20 Jonathan E. Reyman, Archaeoastronomical Fieldwork
2:40 Peter P. Pratt, A New Technique for Intra-Site Mapping
3:00 Thomas R. Lyons, James I. Ebert, and Robert Hitchcock, The Use of Remote Sensing in the Mapping and Analysis of a Prehistoric Irrigation System
3:20 Louis James Tartaglia, Infrared Archaeology
3:40 Harold F. Turnbull and R. E. Taylor, Direct Dating of Fossils by Amino Acid Analysis
4:00 Anta Montet-White and Roger Grosser, Application of Fourier Series to the Time-Trend Analysis of Archaeological Data
4:20 Leslie E. Wildesen, A Quantitative Factorial Model for Archaeological Site Development
4:40 George B. Thomas, Demonstrating the Pot Hunter Factor: Uncontrolled Selective Treasure Hunting, and Controlled Surface Collection Near Mitla, Oaxaca

(40) General Session: INTERSOCIETAL CONTACTS

- Regency Room
Chaired by: Alice Kehoe
Participants:
2:00 Chris White, Methodological and Technical Problems Involved in the Analysis of Patterns of Prehistoric Warfare
2:20 Carol M. Hubbard and John P. Malloy, Political and Economic Institutions in Late Postclassic Southern Mesoamerica
2:40 Joan B. Townsend, Eighteenth and Nineteenth Century Eskimo and Indian Movements in Southwestern Alaska
3:00 Alice B. Kehoe, Derivation and Testing of a Model of Culture Contact from an Eighteenth-Century Fur Trade Post
3:20 Yoshihiko H. Sinoto, Polynesian Occupation on Pitcairn and Henderson Islands, Southeast Pacific

(41) General Session: ECOLOGY, RESOURCES, AND SUBSISTENCE

- English Room
Chaired by: John M. Fritz
Participants:
2:20 Morgan J. Tamplin, Land-Inventory Resource Data for Archaeological-Environmental Reconstruction

- 2:40 Suzanne P. DeAtley and Frank J. Findlow, On Raw Materials Use and Environmental Change
 3:00 J. Raymond Williams, Prehistoric Econiche Food Resource Utilization on Tampa Bay
 3:20 Alfred Johnson, Kansas City Hopewell Hunting and Gathering Territories
 3:40 John M. Campbell, An Explanation of Prehistoric Population Sizes and Densities in Interior Alaska and the Yukon
 4:00 John M. Fritz, Models for Prehistoric Subsistence Organizations
 4:20 Norman M. Whalen, Delayed Acceptance of Agriculture in the Southwest
 4:40 Elizabeth S. Wing, The Role of Domestic Animals in the Andes

(42) Symposium: TRAINING IN ARCHAEOLOGY

Comstock Room

1:30- Organizer: William P. McHugh

5:00 Chaired by: William P. McHugh, G. Richard Peske

Participants:

Jean S. Aigner, Multidisciplinary Training and Research in the Aleutian Islands

M. Ann Bennett, Formal Instruction in Ceramic Analysis

Brian M. Fagan, Cans't Thou Draw Out Leviathan with a Hook? An Essay in the Teaching of Introductory Archaeology

Richard I. Ford, Training in Anthropological Archaeology at the University of Michigan

L. G. Freeman, The View from the Cave: The Training of Paleolithic Prehistorians and Paleo-Anthropologists in the New World

Roger E. Kelly, The Archaeological Laboratory: Step-Sister or Cinderella?

William P. McHugh, The Teaching of Archaeological Anthropology—Ten Years Later

Paul S. Martin, An Approach to Training Archaeologists as Anthropologists: An Educational Philosophy

Clement Meighan, Research vs. Pedagogy in Archaeological Fieldwork

Stanley J. Olsen, Zooarchaeology in the Anthropology Curriculum

Robert Whallon, Jr., Archaeological Training in Computer Applications and Statistical Analysis

(43) General Session: MESOAMERICAN RESEARCH II

California Room

Chaired by: Norman Hammond

Participants:

2:20 Marion P. Hatch, A Possible Calendar in the Madrid Codex

2:40 Benjamin Brown, A Brief Survey of Eastern Guanajuato

3:00 Arthur G. Miller, Excavations at Tancah, Quintana Roo, Mexico

3:20 Norman Hammond, Archaeological Investigations in Northern Belize (British Honduras), 1973

3:40 Susanna Ekholm-Miller, Piedra Parada, Chiapas

4:00 Barbara Voorhies, Archaeological Investigations in the Coastal Zone, Chiapas, Mexico
 Discussion

(44) General Session: PLAINS AND THE EAST

Golden Gate Room

Chaired by: Patricia J. O'Brien

Participants:

2:00 Tom P. Dillehay, Shifting Ranges and Successive Fluctuations of Bison Population Densities on the Southern Plains During the Late Quaternary

2:20 Alan P. Olson, An Examination of Some Front Range Archaic Complexes in Colorado

2:40 Michael D. Metcalf and Elizabeth Ann Morris, Excavations at Dipper Gap: A McKean Complex Campsite, Logan Co., Colorado

3:00 Carlyle S. Smith, A Comparison of Fifty Bell-Shaped Cache Pits at the Talking Crow Site, South Dakota

3:20 Ann S. Johnson, Trend-Surface Analysis of Radiocarbon Dates from Woodland Sites in the Plains

3:40 Lathel F. Duffield, Physiographic Provinces and Kentucky Prehistory

4:00 Lathel F. Duffield and Louise M. Robbins, MR Deficiency: A Prehistoric Disease?

4:20 Patricia J. O'Brien, A New Synthesis of Steed-Kisker (Western Middle Mississippian) Culture

4:40 Marjorie K. Burger, The Iroquois of the St. Lawrence Valley: Problems of Tribal Identification and Disappearance

(45) General Session: NORTHWEST SOUTH AMERICAN ARCHAEOLOGY

Forty-Niner Room

Chaired by: Karen O. Bruhns

Participants:

2:20 Erika Wagner, Cultural Relationships and Chronology of Some Unclassified Phases in Western Venezuela

2:40 John P. Marwitt, Robert Morey, and James Zeidler, Reconnaissance of the Upper Ariari River Region, Dept. of the Meta, Eastern Colombia

- 3:00 Karen Olsen Bruhns, Absolute Dates for the Quimbaya Culture of Central Colombia
 3:20 William J. Mayer-Oakes, An Obsidian Source in Highland Ecuador
 3:40 Akkaraju Sarma and Barry A. Bogin, Climatic and Botanic Observations from South Coastal Ecuador
 4:00 Evelyn S. Kessler, Ceramics from the Tolas of Otavalo, Ecuador
 4:20 Paul P. Ossa, Quirihuc Shelter: Dating the Paján Lithic Complex in North Coastal Peru
 4:40 James S. Kus, Chimu Irrigation at the Quebrada de Oso Site, North Coast Peru

ABSTRACTS OF ORGANIZED SYMPOSIA

Note that not all symposia have symposia abstracts nor do any general sessions

(1) **ECOLOGICAL ANTHROPOLOGY.** There are 2 main objectives for this symposium. The first is to determine how elements of the behavioral repertoire of a particular population interact systemically with non-cultural as well as other cultural elements within the ecosystem. Ideational and other "social" or "cultural" elements can be variables in functional relationships with others; as has been demonstrated in terms of ritual and sanctity, cultural elements may serve as mechanisms regulating the relationships among the variables within the system. The second objective is to determine how ecosystems maintain stability and change through time. Because variables in ecosystems often fluctuate, regulatory mechanisms must be capable of maintaining and reestablishing appropriate relationships if the system is to persist. When the operation of these mechanisms fails, evolution may be said to occur. This symposium will explore the processes of stability and change and the role cultural factors play in them.

(2) **LITHIC TECHNOLOGY SYMPOSIUM: DEBITAGE ANALYSIS.** This symposium session will present a selection of papers devoted to the topic of lithic debitage analysis. Emphasis on lithic technology in the past decade has focused chiefly on analyzing finished tools, recognizing reduction techniques, and experimental studies aimed at replicating prehistoric tools and wear patterns. Recent studies of debitage has brought to light the data potential of this common artifact class. It is the aim of this symposium to present case studies illustrating some of the kinds of information that can be gained through debitage analysis.

(3) **DATA BANKS AND RELATED USES OF COMPUTERS IN ARCHAEOLOGY.** During the last several years at SAA meetings, there has been an increasing number of papers on the uses of computers in archaeology, but usually scattered almost randomly throughout the meetings in various sessions. Some have been on archaeological data banks, while others were on other uses of computers in archaeological research. Now, it is time to have a session devoted solely to computers in archaeology. This suggested symposium is emphasizing the role of archaeological data banks since they are seemingly attracting considerable attention among archaeologists today and are relevant to anyone dealing with archaeological data for almost any purpose. The general purpose of this symposium is to present some of the different ways in which data banks are being used by archaeologists around the country and to suggest other possibilities and future goals.

(4) **HOLOCENE CLIMATIC CHANGE IN THE GREAT BASIN: PRESENTATION OF REGIONAL SEQUENCES.** Several recent archaeological studies in the Great Basin have employed paleo-climatic reconstructions, which, although based on different kinds of data gathered from different parts of the Basin, are quite similar. The time seems ripe for an attempt at a Basin-wide, paleo-climatic correlation and a reevaluation of the climatic models proposed by Antevs and others. Toward that end, each participant of this symposium will present a paper containing substantive paleo-climatic data from a Great Basin locality or localities. Each paper will also contain a summary in the form of a regional climatic sequence. Basin-wide correlations of these regional sequences will be attempted during the following symposium.

(6) **ARCHAEOLOGY IN THE 70'S—MITIGATING THE IMPACT.** Responsible and efficient planning for the nation's archaeological programs depends on a realistic assessment of needs which can be identified through thoughtful regional overviews. An obvious first step will be the preparation of regional syntheses of work already accomplished. The crisis in American archaeology raises questions of urgent relevance: What is left to do? How much time remains? Who will undertake the studies? How can we pay for them? And how do these questions relate to anthropology in general? Representatives from the various regions will explore these questions and discuss mechanisms and approaches by which solutions can be found and implemented.

(9) **THE GREAT AMERICAN DREAM MACHINE: ARCHAEOLOGISTS IN THE WORKS.** For the past decade the discipline of archaeology has been in a state of flux and ferment over issues of epistemological goals and relevance, accountability, and public awareness. We propose that archaeologists as archaeologists can apply their method and theory to the study of material culture in modern human behavior. Archaeology can build on its core of method and theory to study material culture and its behavioral correlates in any cultural setting.

(10) **ISLAND ADAPTATION: CURRENT RESEARCH IN HAWAIIAN ARCHAEOLOGY.** During the past several years Hawaiian archaeological research has concentrated on patterns of adaptation to island environments. The extensive remnants of agricultural systems, in particular, have begun to be exploited by archaeologists. This symposium brings together the results of this recent research by emphasizing development and change in agricultural and residence systems, resource intensification, and social boundaries and complexity. The

theme of island adaptation provides the basis for arguments of relevance to larger anthropological problems, such as expansion into uninhabited environments, population growth and resource use, and the elaboration of social stratification.

(11) **ARCHAEOLOGY AND EDUCATION.** The topics under consideration are of specific relevance to archaeologists in public positions such as those working in museums and on salvage and survey work. Proper education in archaeology has too often been restricted to academic circles, leaving the public and special interest groups to fend on their own. The critical state of American archaeology today and its fate will depend, to a great extent, on an educated public, informed legislators and industrial managers, and on cooperation with Native Americans. The symposium is designed to cover several aspects of public education and their attendant problems.

(12) **HOLOCENE CLIMATIC CHANGE IN THE GREAT BASIN: CORRELATION OF REGIONAL SEQUENCES AND REEVALUATION OF PREVIOUS CLIMATIC MODELS.** An interdisciplinary panel of discussants will provide syntheses and trial correlations of the regional climatic sequences presented in the previous symposium, as well as comments on the implications of the data in terms of their particular specialties: vegetation, geomorphic processes, long-term weather systems, and, of course, people and culture. Further comments and data from the floor will be called for, after which the panel, the participants of the previous symposium, and those in general attendance will engage in free discussion. The proceedings will be taped.

(14) **FEDERAL ARCHAEOLOGY: THE PUBLIC WORKS PROJECTS OF THE DEPRESSION YEARS.** It is over 40 yr since shovels were handed to participants in the first publicly funded projects in archaeology organized as a response to the unemployment of the Depression years. Among these were the PWA, CCC, NYA, WPA, and TVA projects; the latter generating what was probably the first publicly funded salvage archaeology. The symposium will cover the history of the public works projects; how archaeology came to be incorporated; how projects were selected, organized, funded, published. Discussion will include a consideration of the goals of this research and whether participants believe these were reached. The effect of "New Deal" archaeology on subsequent American research (i.e., methods of excavation, research design, processing, analysis, etc.) will be discussed.

(15) **PALEO-INDIANS IN THE GREATER SOUTHWEST.** Information has been steadily accumulating on the Paleo-anthropology of western deserts but no program has yet been organized to exchange and synthesize data. The time is now ripe for a symposium of experts to discuss and codify problems, procedures and theories pertaining to the archaeology of desert surfaces. Such a symposium will contribute significantly to knowledge of early hunter-gatherers in the New World.

(19) **HISTORIC INDIANS OF FLORIDA AND SOUTHEASTERN GEORGIA: ETHNO-HISTORICAL-ARCHAEOLOGICAL CORRELATIONS.** Changes in aboriginal southeastern populating 200 yr of European contact afford the anthropologist a comparative field situation for the study of rapid culture change occurring through contact between western cultures and non-western (derived), non-white cultures. Because such contact situations are widespread and have received a great deal of theoretical attention, the anthropologist is able to predict form and results of specific Southeast European-Indian contact situations and to test hypotheses with archaeological methods. Likewise, where the form and results of culture change are known from documentary evidence, archeological methods can be tested. Thus, the symposium will have 2 goals: (1) to provide theoretical information of rapid culture change; and (2) to demonstrate which archaeological artifacts and features represent which known ethnographic forms and events.

(20) **FUNCTIONAL ANALYSIS OF STONE TOOLS.** The aims of the symposium will be similar to those of the symposium held at the SAA meeting in Miami. Discussion will center on (1) the mechanics of flaking stone by percussion and pressure, and the application of these principles to the study of edge damage on stone tools; (2) experiments in the production of edge damage on stone flakes by various activities; (3) the current aims and status of functional analysis of stone tools.

(21) **PREHISTORIC RAW MATERIAL TRADE AND ARCHAEO-ECONOMIC PROCESSES.** Recently, archaeologists have devoted a great deal of attention to the problem of determining prehistoric trade relationships by establishing the origin of raw materials and artifacts within archaeological sites. The value of this archaeological research is that it provides an opportunity to study the broad economic processes in a chronological perspective. Unlike ethnographic studies on economic process, the archaeologist is provided with a record which reflects the repeated phenomena of socio-economic interaction, although these actual processes remain to be determined. Although no general archaeo-economic theory has been elucidated up until now, it is hoped that this symposium will serve as a stage in its development.

(22) **NARRATIVE SCENES IN MESOAMERICAN ART: A SOCIO-CULTURAL PERSPECTIVE.** Participants in the symposium will discuss the problems and the potential of the use of a socio-cultural framework to analyze figure and scene portrayal in Mesoamerican art. Some of the figures and scenes portrayed seem to represent historical events. For these

pictures to convey information about the individuals and/or the events taking place, there must be visual signals or cues that identify the individuals' position in the socio-cultural universe. These visual signals are usually found in items of dress, hair style, ornament, and ethnic stereotypes. The symposium papers will be oriented around the application of the socio-cultural framework to different art media in Mesoamerica. Each paper will be concerned mainly with 1 medium and 1 stylistic zone. They will deal with the socio-cultural information obtainable on one or more level (individual, group, society). They will assess how useful this approach is in the different media and how the results of analysis can aid in a better understanding of the structure of Mesoamerican society.

(27) **THE RISE AND FALL OF THE CENTRAL MEXICAN CLASSIC.** A long-standing topic of interest in Mesoamerican archaeology has been the elucidation of possible factors involved in the rise and fall of Classic Maya civilization. Two recent contributions have examined the subsistence base for Maya civilization in the light of marine resources and both internal and external stresses which may have been involved in the collapse of the Classic Maya civilization. By contrast, it would seem that little concentrated effort has been expended toward careful examination of factors involved in the rise and fall of central Mexican Classic civilization. The papers of this symposium will focus on the processes involved in either the initial development of the central Mexican Classic or its collapse, as seen from various geographical and cultural perspectives.

(28) **SAMPLING IN ARCHAEOLOGY.** Three general topics will be discussed during the symposium: (1) theoretical and technical problems in the application of probabilistic sampling to archaeological data, (2) sampling within a single site, and (3) sampling within archaeological regions. The first topic includes papers that relate all aspects of archaeological research and the nature of the archaeological record to the sampling of total populations. Two technical papers discuss characteristics of populations and of samples and the nature of archaeological research. The last 2 topics—sampling within the site and the region—have the same format: an introductory paper(s) that attempts to bind the remaining case studies together. The case studies are descriptive statements and self-criticisms of the sampling experiences of the authors.

(31) **CURRENT DIRECTIONS IN CALIFORNIA ARCHAEOLOGY.** Prehistoric California provides a laboratory for the study of social and cultural change among non-agriculturalists in a varied and dynamic environment. This symposium attempts a broad overview of current attempts to realize this potential, utilizing a diversity of theoretical, methodological, and organizational approaches.

(42) **PROBLEMS AND POSSIBILITIES OF ARCHAEOLOGICAL FIELD SCHOOLS.** Archaeological field schools are offered to provide training to students and to acquire archaeological evidence. This symposium focuses on the problems in achieving these 2 goals. The strategies and problems of field school programs and how they affect the achievement of the dual goals are presented in the papers with a general discussion to follow.

RECORDING SESSIONS

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

ABSTRACTS OF PAPERS

Ackerman, Robert E., **A MACROCORE AND FLAKE INDUSTRY IN SOUTHEASTERN ALASKA (CIRCA 8200-3700 B.P.).** The Ground Hog Bay site #2 is 40 mi west of Juneau, Alaska. The early occupation (Component III, 10,180±800 B.P.; 9,130±130 B.P.) is evidenced by few artifacts and remains enigmatic. The next occupation (Component II, 8230±130 B.P.; 3750±100 B.P.) is well defined by a lithic assemblage which contains microcores and microblades with a macrocore and flake industry. The upper cultural layer (Component I, 345±85 B.P. to circa 50 B.P.) is marked by a ground stone inventory with split plank houses. The macrocore and flake industry of Component II will be presented as a further elucidation of the cultural inventory of the GHB 2 site. Specifically, attention will be directed to the technological attributes of the two macrocores types—blade-flake cores, and Levallois cores. Finally, the association of the macrocore industry with the remainder of the lithic assemblage from Component II will be presented in the concluding part of the paper with a tentative formulation of a lithic complex in Southeastern Alaska at this time level. (7)

Adams, R. E. W., **FINE ORANGE POTTERY AS A SOURCE OF ETHNOLOGICAL INFORMATION.** The Altar and Balancon (X and Z) groups of Fine Orange pottery yield certain specific identifications of ethnic groups. These groups are thought to include the makers, located on the Gulf of Mexico to the West of Laguna de Terminos, and more rarely, people from the zone of classic Maya culture. Cultural and historical implications are discussed. (22)

Adovasio, J. M., **THE EVOLUTION OF BASKETRY IN PREHISTORIC MEXICO.** Recent analyses of some 2000 well dated specimens of coiled, twined, and plaited basketry have provided the data necessary for a detailed reconstruction of the technical evolution of basketry in prehistoric Mexico. The major aspects of this 9000 year developmental sequence are discussed with special emphasis on the spread of Mexican techniques into the American Southwest. (26)

Agenbroad, Larry D., **THE HUDSON-MENG PALEO-INDIAN BISON KILL, N.W. NEBRASKA: AN ANALYSIS AFTER TWO FIELD SEASONS.** Excavations, test pits, and backhoe trenching in the 1972 field season have led to a better understanding of the site occurrence and a tripling of its size and faunal estimate. Twelve artifacts of 2 paleo-point styles were recovered from the bone bed. Lithic workshop areas have been identified and new information on butchering techniques and faunal analysis have been derived. (38A)

Aigner, Jean S., **MULTIDISCIPLINARY TRAINING AND RESEARCH IN THE ALEUTIAN ISLANDS.** The current University of Connecticut multidisciplinary project in the Aleutians has several major goals: research into human biocultural adaptation over time to a rich, maritime ecosystem; biomedical and other studies which positively benefit the Aleuts; and training of undergraduate and graduate students from various disciplines in multidisciplinary research. The training aspect of the project is discussed here. The training offered as part of the project makes use of a model research area in which recoverability of information through multidisciplinary design and strategy is patent. The skills and knowledge gained from this integrated approach serve as intellectual models for participants regardless of the geographic area and particular discipline in which they concentrate their professional work. (42)

Aigner, Jean S., and Bruce Fullem, **SANDY BEACH BAY, A 4300-5600 B.P. ALEUT VILLAGE.** The 1972 reconnaissance of southwestern Umnak led to the discovery of Sandy Beach Bay, a large maritime village which has been located on a bay subsequently destroyed by filling and uplift. Excavations revealed a 1000 year sequence of semi-subterranean houses with rich representation of Aleut stone tool kits from each of 6 house floors and from roof tops. Technological comparisons with both earlier Anangula (8400 B.P.) and later Chaluka (4000 B.P.) Aleut base villages reflects the chronological intermediacy of Sandy Beach Bay. Activity loci reconstructed from the remains indicate the nature of behavioral continuity in Aleut villages spanning thousands of years in the same locale, and the magnitude of change in the fabricational behavior attending stone tool manufacture. (38A)

Aigner, Jean S., and Douglas Veltré, **UMQAN BURIALS FROM SOUTHWESTERN UMNAK ISLAND, ALASKA.** The 1972 reconnaissance of southwestern Umnak Island led to the discovery of some 50 features identified by the Aleuts as root storage facilities. Upon excavation these umqan proved to be structures for the interment of both adult and young Aleuts. Usually removed from habitation sites and occurring in clusters on hillsides overlooking water, umqan burials reinforce patterns noted by both the early Russian observers and later demographers; birth, stillbirth, and abortion were reported to the Aleut community, as well as the death of adolescents and adults. It would appear further that the value of all individuals as community members, both realized and potential, is reflected in the care and considerable effort invested in the umqan pattern of burial. (7)

Ames, Kenneth M., CULTURAL STABILITY ON THE NORTHWEST COAST. Results of recent archaeological excavations in the Prince Rupert Harbor region of British Columbia suggest that the area has been culturally stable for almost 5000 yr. This stability is based upon the evolution of an efficient adaptation to a highly variable, high diversity environment. The efficiency of the adaptation required a complex interplay between technology, social organization, and population density. (37)

Ammerman, A. J., and L. L. Cavalli-Sforza, A SIMULATION STUDY OF BANDKERAMIK SETTLEMENT PATTERNS. This simulation study represents an attempt to explore the relationships between some of the main factors involved in the formation of Bandkeramik settlement patterns. Particular attention is paid to the roles that population growth and local migratory activity may have played in the spread of the Bandkeramik and in determining patterns of settlement. Simulation results and archaeological evidence can be evaluated in the light of one another. Some comments are made on the reformulation of certain Bandkeramik interpretations and questions. (24)

Asch, David L., SOME PROBLEMS IN ARCHAEOLOGICAL SAMPLING. A number of problems in the sampling of archaeological sites will be discussed. Effective sample sizes are often small for the purposes of statistical description and analysis, even when large quantities of cultural material have been excavated. Several reasons for this are enumerated, and effects upon sample reliability are discussed. For the solution of certain kinds of archaeological problems it is difficult to design suitable probabilistic samples. For instance, spatial structure is particularly difficult to investigate using probability techniques. Several issues are raised in the application of analytical, as opposed to descriptive, statistics to archaeological samples because of spatial autocorrelation in the data and because complex sampling designs must often be used. (28)

Ayres, James E., BEEF AND BOOZE I: DEMOGRAPHY OF FOOD CONSUMPTION IN AN URBAN ENVIRONMENT, 1870-1900. This project is designed to compare the effects of ethnic background and relative household economic level on the long-term patterns of meat and liquor consumption in the American diet. Relative economic level is determined from trash recovered by the Tucson Urban Renewal Project. Property ownership records are examined for ethnic background information. The effects of ethnicity (Chinese, Anglo, and Mexican-American) and economic status on consumption of these 2 necessities is examined over a 30 yr period (1870-1900) in Tucson, Arizona. (9)

Barbour, Warren, THE ROLE OF RELIGION IN THE FALL OF TEOTIHUACAN. There is evidence supporting a great amount of religious continuity from Metepec into Oztoticpac and Coyotlatelco. A certain complex of figurines, including throned figurines and a possible Earth Goddess, continues, while another complex, including portraits and cylindrical body figurines, is discontinued or radically changed. The religious implication of strong continuity into Coyotlatelco-Xometla times will be discussed. (27)

Baron, Aileen G., RADIOCARBON DATES FROM THE PALESTINE AREA. Although a number of radiocarbon measurements are available for the Palestine area, some anomalous dates, particularly from the Neolithic period, and discrepancies between Bronze Age radiocarbon and expected dates have distorted interpretations of the kind of information that can be gained from radiocarbon dating. Application of the Bristlecone Pine sequence for calibration of dates prior to 5200 B.C. indicates a closer agreement between historically related and radiocarbon dates. This paper presents a review of extant radiocarbon dates for the Palestine area, and discusses the significance of radiocarbon measurements from the area for archaeological interpretation. (25)

Bates, Daniel G., PRODUCTION AND POPULATION AMONG NOMADIC HERDERS. This paper discusses the correlates of productivity in animals, labor, and family size for a nomadic pastoral population. Specifically, the analysis indicates the strong relationships between herd size and family size, between herd size and the demands of consumption within the household, and between the intensity of production (worker output) and demands of consumption. This concern with variables related to production is relevant to an understanding of significant aspects of nomadic pastoral adaptation, including demographic processes. These variables are also essential to models which purport to show the interactions of such populations with populations in other modes of production. (1)

Benfer, Alice, A PRELIMINARY LITHIC ANALYSIS OF OBSIDIAN FROM PRE-HISTORIC TULA. Obsidian is the second most numerous class of artifacts recovered from the 1970-72 excavations of Tula—the capital of the Postclassic Toltec state. Aspects of the lithic analysis include: (1) a multivariate analysis of a sample of prismatic blades to determine nonredundant attributes for different phases of lithic analysis (i.e., blade production technology, stylistic variation, wear pattern studies); (2) discussion of core preparation and blade production methods; and (3) the use of neutron activation and other methods to examine intrasite variation in the use of raw materials. (38)

Benfer, Robert A., ITERATIVE DETECTION OF CASE AND VARIABLE REDUNDANCY IN ARCHAEOLOGICAL SAMPLES. Two major problems of anthropological sampling are the adequate definition of a universe and the detection of redundancy within samples. The following procedures are suggested as a method for discovery of case and

variable redundancy by iteration: (1) preliminary principal components analysis of the data to create new, uncorrelated variables (components), although decorrelation may be inefficient since among and within groups variance is not distinguished; (2) cluster analysis of components to produce relatively homogeneous groups with respect to the components; (3) canonical variate analysis of the grouped data to create another new set of variables (canonical variables) that are uncorrelated within the groups; (4) cluster analysis of canonical scores to remove additional case redundancy; (5) steps (3) and (4) are repeated until group membership does not change further. The final results are groups very homogeneous (redundant) for variables that are very independent (non-redundant) for the groups. The technique is illustrated using materials from the archaeological site of Tula, Hidalgo, Mexico. (28)

Bennett, M. Ann, FORMAL INSTRUCTION IN CERAMIC ANALYSIS. Pottery is a major concern of professional archaeologists and, accordingly, constitutes a "subject" that must somehow be taught to students. The usual means of instruction is, quite literally, an apprenticeship—a supervised learn-by-doing situation. At ENMU a different, if not altogether unique, approach is being taken—that of formal classroom instruction in ceramic analysis. Lectures, reading assignments and practical laboratory exercises are combined to give students a firsthand acquaintance with the wide range of analytical techniques applicable to the study of ceramics. This paper describes our present program, and the pros and cons of its formalized, comprehensive approach. (42)

Berger, Edward, SIMULATION IN THE SOCIAL SCIENCES. This paper examines the general role of simulation in the social sciences. Since the author is a political scientist, it focuses on the interdisciplinary areas of simulation experiments for social policy making and the development of social science theory. (24)

Bettarel, Robert, and Ronald Schwartz, DEMOGRAPHY AND EARLY MAN IN THE AMERICAS: A COMPUTER SIMULATION MODEL OF POPULATION GROWTH AND DISPERSAL RELATING TO MAN'S ENTRY INTO THE AMERICAS. In this paper we attempt to estimate the time required for an initial group of migrants to completely populate the area of North America. The problem is briefly outlined and current estimates of the time of man's entry into the New World are identified. A model of population growth and dispersal is then run using different sets of values and an estimate is made of the time required to fully populate the continent. By using different sets of values we attempt to bracket the time of entry and minimal and maximal estimates of the time required to fill the area are formulated. These estimates are then used to argue for one of the alternate dates of entry. A test of the model is offered, followed by a discussion of the advantages and disadvantages of this technique for problems of this type. (24)

Bettinger, R. L., SETTLEMENT CHANGE AND STABILITY IN EASTERN CALIFORNIA: A DISCUSSION OF THE PRELIMINARY RESULTS OF THE OWENS VALLEY PROJECT. Recent investigations in the Great Basin have reached certain conclusions regarding questions of environmental change and the application of ethnographic models in archaeological contexts. In order to further test the conclusions of some of these studies, the Owens Valley Project has devised a set of field expectations based on existing archaeological, ethnographic, and climatological information. These propositions were initially tested during a 1972 summer field season. Problems of sampling and field technique as well as preliminary results are discussed. (31)

Bickel, Polly, Thomas Jackson, and Thomas King, RISING SEA LEVELS ALONG THE CALIFORNIA COAST: A PRELIMINARY CONSIDERATION OF SOME POSSIBLE ARCHAEOLOGICAL CONSEQUENCES. Approximate California coastlines circa 10,000, 7000, and 5000 yr before present are plotted on the basis of currently available geological data. The effects of such shorelines on the distribution and adaptive poses of California populations is considered. (37)

Binford, Lou, MINIMAXING LABOR IN RESPONSE TO STRESS. (8)

Birrell, Verla, SEVEN INDEPENDENT ASPECTS OF COLOR. Color has become an ever-increasing source of general interest and of investigation by scientists, artists, and designers since Newton discovered that white light can be broken by a prism into its constituent rays of rainbow-tinted sequential hues. The recent interest of anthropologists and archaeologists in the cultural associations of color identification and designation is only one of 7 aspects of color which will be discussed. (26)

Black, Robert F., LATE QUATERNARY GEOMORPHIC EVENTS RELATED TO PALEO-ALEUTS, UMNAK ISLAND, ALASKA. Geologic studies during 5 field seasons permit reconstruction of late Quaternary geomorphic events and their correlation using radiocarbon-dated ash and soil sequences. An ice cap about 600 m thick covered Umnak Platform until about 11,000 yr ago. Eustatic rise of sea level and isostatic rebound of the platform canceled each other about 8000-3000 yr ago resulting in sea-level stability at about plus 3 m and in rapid lateral coastal erosion of strand flats and rocky shoals. As eustatic rise diminished, isostatic rebound lowered sea level to its present position. A catastrophic eruption of Okmok Volcano about 8000 yr ago is considered the most likely cause for abandonment of Anangula which survived marine erosion by fortuitous rock formations

and deep water. Some younger sites of Paleo-Aleuts were on bays now filled and on islands now joined to Umnak Island by infilling. Other sites are being eroded. A Neoglaciation about 3000 yr ago had little direct effect on the people. (7)

Blanton, Richard, A SYSTEMIC APPROACH TO THE RELATIONSHIP BETWEEN POPULATION GROWTH AND SOCIO-CULTURAL CHANGE. Some theoretical approaches to the explanation of socio-cultural change attribute key causal significance to population growth and population pressure. In particular, increase in population size and density has often been used to explain the intensification of cultivation. But what explains the increase in population size and density? In this paper some of the inconsistencies in this approach are pointed out and the application of a systemic causal framework is suggested. Population variables seem to be better examined in the context of an ecosystem within which they are functionally interrelated with a number of other variables. This theoretical framework permits us to examine population growth in terms of the system's "mechanisms" operating on this variable and thus look at socio-cultural change as a process involving a number of related factors. In addition, I will point out some of the problems involved, when using limited archaeological data, in determining whether changes in population variables were independent, or whether such changes were dependent upon changes of other ecosystem variables. (1)

Blanton, Richard E., and Dudley P. Varner, THE RISE AND DECLINE OF THE CLASSIC IN THE VALLEY OF OAXACA. Recent systematic, intensive surveys of Monte Alban and the Etla (north) arm of the Valley of Oaxaca allow detailed comparisons of this region with the Valley of Mexico in terms of demographic shifts and settlement pattern shifts during those periods pertaining to the rise and fall of the Classic. While the Monte Alban urban complex is in many respects quantitatively and qualitatively unlike Teotihuacan, certain similarities exist regarding the impact of the growth and decline of these centers on populations in their sustaining areas. (27)

Bolian, Charles, FINCA RIVERA: A POLYCHROME SITE IN THE TRAPEZIO OF AMAZONAS, COLOMBIA. Excavations at Finca Rivera in the Trapecio of Amazonas revealed that the carriers of the Polychrome tradition had reached this section of the Amazon Basin by A.D. 1030. The ceramics from the site are of the Miracanguera sub-tradition and appear to be closely related to the Napo complex of eastern Ecuador and the Caimito complex of eastern Peru. If these ceramics represent the ancestors of the historic Omagua or the historic Cocama, Tupian-speakers had migrated into this area earlier than previously proposed. The Carbon-14 dates from Finca Rivera suggest that the presence of Polychrome ceramics in this section of the Amazon Basin are the result of an upstream migration. (30)

Briuer, Frederick L., A STUDY OF NATURAL AND CULTURAL REFUSE IN NORTH-EASTERN ARIZONA ROCK SHELTERS. The excavation of both cultural and non-cultural rock shelters in Chevelon canyon near Heber, Arizona, has yielded data useful in testing propositions of interest to archaeologists. Dry cave preservation presents an opportunity to investigate both natural and cultural depositional processes as well as questions concerning prehistoric activities and seasonality. The interrelatedness of these questions gives a focus for directing the methodological and analytical considerations in this research. (33)

Brockington, Donald L., THE DEVELOPMENT OF THE CLASSIC ON THE OAXACA COAST. Archaeological knowledge of the Oaxaca coast is based on our quick surveys and on small-scale tests in 13 sites. While study is not finished, preliminary conclusions are in agreement. It appears that styles and techniques typical of the late Preclassic persisted into late Classic times and there seems to have been a low level of socio-cultural integration during the Classic. While there is evidence of trade and contact with surrounding regions, it would appear that coast peoples did not possess many of the characteristics usually taken to define "Classic." Several suggestions are given to help explain their apparent failure. (27)

Brooks, Richard H., and Sheila T. Brooks, EXCAVATION BY REQUEST: ARCHAEOLOGICAL RECOVERY OF PIONEER BURIALS. Expansion of the parking facilities of a town mortuary necessitated the removal of the cemetery of a Las Vegas, Nevada, pioneer family. Prior bulldozing of the surface of the cemetery and removal of the grave markers had stripped all indication of the graves. The archaeological problem was to locate the graves and identify the burials with the historical surface evidence destroyed. Employing a backhoe as an adjunct to archaeological techniques, 4 burials and a cement sepulcher were exposed, photographed, and recorded. Identification of the skeletons by a physical anthropologist enabled the confirmation of their historical relationships. (29)

Browman, David L., ECONOMIC INTERACTION OF THE EARLY HORIZON JAUJA-HUANCAYO POLITY. Events reflected in the microcosm of the Jauja-Huancayo basin suggest a reevaluation of the concept of a general pan-Peruvian Chavin Horizon. During the late Initial Period and first 3 epochs of the Early Horizon, the Jauja-Huancayo area was outside the Chavin orbit, participating minimally in local highland exchange networks. The religious bifurcation in Chavin ideology that occurred roughly in Early Horizon Epoch 4 is reflected by marked concurrent changes in the Jauja-Huancayo economic interaction sphere, particularly in the copper trade. Ceremonial and religious practices associated with Chavin

first appear in Early Horizon Epoch 8, in terms of a reformed Paracoid variant of the Chavin cult which sweeps the altiplano and puna at this time. (32)

Brown, James A., AN APPLICATION OF A SPECIALIZED DATA BANK FOR ANALYSIS AND INFORMATION RETRIEVAL IN THE FIELD. This paper describes a computerized data processing and information retrieval system specifically designed to meet the information requirements of a large-scale archaeological investigation at the Koster site, a deep stratified Archaic site in southern Illinois. The purpose of the system is to make up a deficiency present in most large-scale programs by: (1) offering an efficient means of expediting data analysis and (2) providing feedback during the course of excavation that affects field decision making, student instruction and sampling procedures. The on-site use of a remote terminal is the key element in the success of the system. The data bank is restricted to accumulating specific classes of debris that provide quickly attainable means of discovering the type and intensity of occupation through statistical analysis. (3)

Brown, James, A., DEEP SITE EXCAVATION STRATEGY AS A SAMPLING PROBLEM. Although the problem of sampling deeply buried strata has occupied the attention of archaeologists for some time, the increasing dependency on explicit sampling procedures generated from a sampling model in archaeology today makes the use of information from deep site excavations much more difficult. It is obvious that investigations of deeply buried occupations are more often a direct projection of the excavation strategy of the uppermost strata than they are specific to any of the lower. Although the sampling problems are immense, this paper suggests a model and appropriate procedures that can help overcome and compensate for some of this problem. This model is the product of experience with applying a computerized on-site data processing system to the excavation of the Koster site, a deeply buried, multi-component open-air site in southern Illinois. (28)

Brown, Margaret Kimball, THE APPLICATION OF A GENERAL SYSTEMS MODEL TO THE STUDY OF CULTURE CHANGE. The changes which occurred in the culture of Indian tribes from European contact generally have been considered by ethnohistorical studies which have used a linear model of causation. Such models can be shown to be too simplistic for the complex network of interrelationships found in any culture, and not capable of use for generalization. A model based on general systems theory is considered more useful since it enables the consideration of a large number of variables and allows for identification of the significant variables of change. Such a model was utilized for a study of the Illinois Indians. The Illinois in the seventeenth century were a large and powerful group, but by the time they moved to a reservation in the 1830's numbered about 200 persons. The model has produced coherent explanations for the changes which took place in the culture and demonstrates the utility of the application of general systems theory to cultural change. (17)

Brown, R. B., A BRIEF SURVEY OF EASTERN GUANAJUATO. The archaeological knowledge of Guanajuato is very sketchy. In the United States it is best known through the salvage work of Muriel Porter at Chapicuaro in the fifties. More recently there has been work by Columbia in the south of the state, I.N.A.H. and Stanford in the west, and I.N.A.H. in the north and east. As a graduate student at the University of the Americas, R. B. Brown has carried out a site survey in the eastern part of the state. The report will be divided into 4 sections: (1) location, description, climate, etc., of area—(a) considerations of climatic change, and (b) site location; (2) summary of antecedents with special attention to the chronology developed by I.N.A.H.; (3) description of major architectural features of ceremonial centers; (4) analysis and dating of architectural features. (43)

Bruhns, Karen Olsen, ABSOLUTE DATES FOR THE QUIMBAYA CULTURE OF CENTRAL COLOMBIA. Archaeological survey and tomb excavation in the Cordillera Central (Depts. of Quindio and Valle) of Colombia has led to the formulation of a cultural sequence for the late prehistoric period. Remains of 2 major subgroups of the material popularly called Quimbaya were recovered and distribution of these 2 groups was plotted. Although the historic component has yet to be identified there is now proof that neither of these 2 cultural complexes pertain to the historical Quimbaya tribe. Instead, there is evidence of a heavy population with a single culture spreading from just north of Buga in Valle to, perhaps, Southern Antioquia dating to about A.D. 800-1200 with a rather drastic depopulation of the entire area some 150 yr before the Spanish Conquest. This may be tied to unsettled conditions during late prehistory and the movement of populations up and down the Cauca drainage, one of which migratory groups was the Quimbaya. (45)

Bullen, Ripley P., THE TOCOBAGA INDIANS AND THE SAFETY HARBOR CULTURE. Ortiz, lost from the Narvaéz expedition of 1528 and rescued by De Soto in 1539; De Soto's chroniclers; Fontaneda, a slave of the Indians for 17 yr; and Menendez, who visited the Tocobaga in 1567, give us glimpses of sixteenth century life around Tampa Bay. It is generally believed that the Safety Harbor site on Old Tampa Bay is the main town of the Tocobaga, the one visited by Menendez. Archaeology has given us many data that define the Safety Harbor cultural area, support the belief that the Safety Harbor site is Menendez's Tocobaga, and agree with other clues gleaned from these sources. (19)

Burger, Marjorie K., THE IROQUOIS OF THE ST. LAWRENCE VALLEY PROBLEMS OF TRIBAL IDENTIFICATION AND DISAPPEARANCE. Jacques Cartier was the first

European to explore the St. Lawrence River and leave any substantial record. Among his accounts, collected between 1534 and 1541, are ethnographic descriptions and vocabulary lists relating to a group since identified as Iroquoian, but which particular Iroquoian group has vexed historians, linguists, and archaeologists for over a century. In 1603 Champlain entered the St. Lawrence area and found no trace of Cartier's Iroquoian speakers. Algonquian-speaking Indians then inhabiting the area reported that the earlier Indians had withdrawn to the interior. Research during the last 6 yr has shown that the Indians met by Cartier were not members of any of the historically known Iroquoian groups, but represent a hitherto unrecognized Iroquoian group which developed in situ in the St. Lawrence area. Shortly after 1541, when Cartier last saw them, this group left the St. Lawrence area and was absorbed by the Huron. (44)

Butler, B. W., LATE GLACIAL AND POSTGLACIAL FLUCTUATIONS IN THE CARRYING CAPACITY OF THE SAGEBRUSH-GRASS REGION OF EASTERN IDAHO. The carrying capacity of the sagebrush-grass region of eastern Idaho as revealed in owl pellet remains at 2 cave sites on the Eastern Snake River Plain has varied considerably over the past 15,000 yr. From 15,000 to 7000 yr ago, there was a continual but markedly fluctuating increase in the carrying capacity of the region. At approximately 7000 yr ago, there was an abrupt decline in the carrying capacity of the region and it has remained at a relatively low level ever since. These changes in carrying capacity can be attributed to climatic events associated with the late Pleistocene deglacial hemicycle and the onset of a postglacial climatic regime. (4)

Callan, Dennis, SETTLEMENT PATTERNS IN HAWAIIAN VALLEY ENVIRONMENTS. Settlement patterns in 4 Hawaiian valleys are compared in terms of residence locations and distribution of agricultural systems. In particular, the archaeological basis for making statements about political control and social stratification is considered. (10)

Campbell, John M., AN EXPLANATION OF PREHISTORIC POPULATION SIZES AND DENSITIES IN INTERIOR ALASKA AND THE YUKON. Late aboriginal and early historic human communities in the interior far northwest were uniformly small, and population densities were low. However, normal numbers of food species were sufficient to support larger communities and higher densities. The archaeology and paleontology imply that these several conditions also existed in the more distant past. Ethnographic studies among the Nunamiut Eskimos, and the Tanana, Atna, and Tutchone Indians fail to establish that social or social-environmental variables (i.e., religious restrictions, subsistence scheduling, warfare, infanticide, contraception, abortion, sexual avoidance, etc.) were the root causes of the widely shared human population characteristics noted. On the contrary, it appears that the peculiar and fascinating phenomenon of synchronic oscillations of populations of quite different vertebrate food species was the single, critical limiting factor. This conclusion is explained, and a prehistoric analogue is suggested. (41)

Cassidy, Claire Monod, NUTRITIONAL DIFFERENCES BETWEEN HUNTING GATHERING AND SETTLED AGRICULTURAL POPULATIONS IN THE EASTERN WOODLAND REGION OF NORTH AMERICA. Nutrition and general health were studied, using 6 techniques of skeletal analysis, in two Amerindian archaeological populations—Indian Knoll (Archaic, western Kentucky, hunter-gatherer) and Hardin Village (Fort Ancient, eastern Kentucky, agricultural [horticultural]). Results of the skeletal analysis indicate that the hunter-gatherers were healthier and suffered far less from malnutrition than the agriculturalists, with other variables controlled archaeologically. Implications: (1) Contrary to common assumption, presence of a stable food supply, alone, does not ensure good nutrition or health—quality rather than quantity is pivotal. (2) Population growth, often identified as a sign of the ecologically well-adapted group may lead to over-hunting of the available game in horticultural groups. Quality protein intake then may fall, the overall dietary balance suffer, and malnutrition, with all its consequences (e.g., deficient growth, lack of resistance to infectious disease) become more common. (1)

Casteel, Richard W., ASSESSMENT OF LIVE WEIGHT AND MINIMUM NUMBER OF INDIVIDUALS OF FISHES FOUND IN THE ARCHAEOLOGICAL CONTEXT. Since the mid-1950's a number of investigators have attempted to represent the remains of vertebrates by means of their potential dietary contribution. This paper examines, in detail, this approach as applied to the remains of fishes in the archaeological context. Methods for the accurate prediction of live weights are presented along with a method for utilizing the information for assessment of the minimum number of individuals (MNI) represented in fish-faunal assemblages. (33)

Castillo-Tejero, Noemi, THE SO-CALLED "MIXTEC POLYCHROME" WARE IS NOT A MIXTEC PRODUCT. Based on recent studies of the Oaxaca, Puebla, and Tlaxcala areas, including surface findings but also different explorations, we believe we can prove that the polychrome ware commonly called "mixtec," is not actually a product of the mixtec people but of their neighbors, those of the Puebla, Tlaxcala, area as Noguera proposed 20 yr ago. (5)

Charlton, Thomas H., THE IMPLICATIONS OF POST-CONQUEST ARCHAEOLOGY FOR METHOD AND THEORY IN PRE-CONQUEST RESEARCH IN THE VALLEY OF MEXICO. During the last 2 decades there have been significant accumulations of surface

survey settlement pattern data for the pre-Conquest period in the Valley of Mexico. With a few exceptions, the conceptual frameworks underlying both data recovery and data interpretation have not developed in sophistication. From studies of the continuing archaeological record in the Teotihuacan Valley (A.D. 1400-1969), I suggest several procedures whereby the theoretical framework of pre-Conquest archaeological studies may be elaborated and strengthened. (35)

Cheek, Charles D., THE STUDY OF NARRATIVE SCENES IN MESOAMERICAN ART—AN OLMEC EXAMPLE. An introduction is given to the strategy of using narrative scenes in Mesoamerican art as a means to reconstruct details of the socio-cultural system of a particular culture. It is assumed that the scenes are meant to communicate information and that they can be interpreted by reference to their internal structure and through comparison with other scenes of the same cultural and temporal period. Using Olmec sculpture, example is given which attempts to explain the differences and similarities among individuals portrayed in scenes within a socio-political framework. (22)

Chenhall, Robert G., A RATIONALE FOR ARCHAEOLOGICAL SAMPLING. There are several areas of archaeological fieldwork and laboratory analysis where sampling techniques appear to offer the possibility of saving time without significant loss of information. Some of the possible applications of sampling are: in the location of sites, in the selection of surface artifacts found at sites, in the selection of sites to be excavated, in the selection of portions of a site for excavation, and in the analysis of artifact collections. Each of these possible applications is examined, first, to determine what the theoretical total population might be in a typical or model research project and, second, to determine the natural and cultural variables that intervene to make it difficult or impossible to estimate that total population from the extant archaeological record. (28)

Ciolek-Torrello, Richard S., and J. Jefferson Reid, PREHISTORIC SOCIAL CHANGE: A SOUTHWESTERN CASE. Changes in domestic facilities are discussed as indicators of changes in domestic group size through time at Grasshopper, a fourteenth century pueblo community in east-central Arizona. Aggregation and environmental stress are discussed as possible explanations for these trends. Comparisons are made with specific aspects of selected pueblo communities in the Southwest. Implications are presented for the development of a model of social change in the prehistoric Western Pueblo. (18)

Clewett, Ed, A PRELIMINARY REPORT ON AN EARLY ARCHAIC SITE IN NORTHERN CALIFORNIA. 4-Sha-5258 is a site located in the foothills of the Northern Sacramento Valley of California on Squaw Creek, a tributary to the Pit River. It seems to offer a stratified correlation between an early archaic adaptation (Carbon-14 6530±300 yr) and the introduction of a Late Horizon complex similar to that used by the protohistoric Wintu. (7)

Clellow, C. William, Jr., PALEO-INDIAN PREHISTORY AND THE ORIGIN OF LANGUAGE. A recent revival in interest centering on the origin of language has raised the possibility that it could have arisen as recently as 35,000 yr ago. At the same time, the date of man's antiquity in the New World has been steadily pushed backward. The possibility looms that some humans were present in the New World prior to the origin of language. Evidence for this supposition is examined, and new theoretical paradigms for understanding of the "pre-projectile point" phase are offered. (17)

Collins, Michael B., ETHNOGRAPHY AND EXPERIMENTATION IN THE STUDY OF ARCHAEOLOGICAL LITHIC DEBITAGE. Ethnographic description and experimental data provide the basis for establishing etic technological possibilities and principles to be used in the interpretation of any emic technological system represented by material remains. Three important principles emerge: (1) debitage is more dependable than finished objects in the determination of past manufacturing procedures; (2) that a given form can be replicated is not proof that the manufacturing procedures have been replicated; (3) ethnographic descriptions are not reliable until verified experimentally. (2)

Collins, Michael B., THE SOURCES OF BIAS IN PROCESSUAL DATA: AN APPRAISAL. A fundamental premise in processual archaeological research holds that human behavior is a patterned part of a system with cultural, social, political, and environmental components. It is necessary to be aware of the possible sources of bias which may intervene between the fact of patterned human behavior and the discernment of pattern by the archaeologist. In this appraisal, 7 such sources are identified and discussed using ethnographic and archaeological examples: (1) not all behavior patterns result in patterned material culture; (2) of those which do, not all will occur where there is an opportunity for inclusion in archaeological context; (3) of those which do so occur, not all will be included in such context; (4) of those which are included, not all will be preserved; (5) of those which are preserved initially, not all will survive; (6) of those surviving, not all will be exposed to—or by—the archaeologist; and (7) among patterns exposed to the archaeologist, not all will be perceived or properly identified. Coping with these potential sources of bias is a major responsibility of the archaeologist. (28)

Connor, Judith G., and William L. Rathje, MASS PRODUCTION AND THE ANCIENT MAYA: EXPERIMENTS IN CRACKING MAYA POTS. Since the pioneering work of

Shepard (1965), little attention has been paid to comprehensive analyses of the physical properties of prehistoric ceramics. One of the reasons for this neglect is that problems have not been formulated for which such data are relevant. The problem of the spectacular demographic restructuring within the Maya lowlands (ca. A.D. 800-900) between the Classic and Postclassic periods provides an opportunity to systematically apply technological analyses to better understand the past. A set of hypotheses have recently been developed which relate this restructuring to changes in economic production and distribution systems. One implication of these hypotheses is that Fine Orange and Fine Gray were mass-produced. This paper presents the results of a preliminary exploration of a research design to evaluate this implication. (21)

Cook, Thomas Genn, **STRUCTURAL COMPARISON OF ARTIFACT COLLECTIONS: THE DISCOVERY OF BEHAVIOR SETS WITHIN SETTLEMENT SYSTEMS.** The meaningful interpretation of subsistence-settlement systems hinges on first discovering the behavior set or sets underlying particular artifact assemblages and then examining the distribution of these behavior sets across the landscape. If we assume that the presence or absence of combinations of tools reflects the performance of tasks at a number of sites, then set theory provides us a precise mathematical and logical framework to discover task-specific tool kits. The assignment of specific tasks to these combinations of tool types can then be tested with other, independent data (e.g., environmental evidence, food remains, features, etc.) at each site under study. Paleo-Indian and Archaic examples will be used. (26)

Cordell, Linda S., **SIMULATING WETHERILL MESA SETTLEMENT PATTERN CHANGES: A DISCUSSION OF GENERAL IMPLICATIONS.** The results of 3 computer simulations that attempted to predict changes in location of settlements which occurred at Wetherill Mesa, Colorado, between A.D. 700 and A.D. 1300 are briefly presented. Problems of a general nature arising from a comparison of the results are discussed. These problems include the choice of models for simulation, the necessity of replicating simulations which include random variables, and difficulties in assessing the relative success of a simulation experiment. It is argued that simulations of a variety of archaeological problems may be useful and that the precision required by simulation is in itself an aid to research, but that the archaeologist should be aware of possible sources of error in interpreting simulation results. (24)

Cowgill, George L., **DATA BANKS AND STATISTICAL ANALYSIS.** (3)

Crabtree, Don E., **EXPERIMENTS IN MESOAMERICAN CORE PREPARATION AND TRUNCATION TECHNOLOGY.** This paper discusses recent experiments which have provided new information on obsidian blade core preparation technology in Mesoamerica. Experiments have also been carried out to explore the methods of core platform truncation. (38)

Crew, Harvey, **EXAMINATION OF THE LITHIC MANUFACTURING METHODS AND TECHNIQUES FROM TARAPACA 2A: PROVISIONAL RESULTS AND FUTURE UTILITY.** A detailed analysis was undertaken on the tools and debitage of the assemblage from Tarapaca 2A to determine what lithic techniques and methods were utilized in their creation. The results obtained provide the basis for hypotheses of spatial relationships and stability of tradition within the preceramic period of northern Chile. (16)

Crumley, Carole L., **CELTIC SOCIAL STRUCTURE: AN EXERCISE IN PALEO-ETHNOGRAPHY.** Two lines of evidence are used to reconstruct the social structure of the Gaulish Celts, who occupied France in the first century B.C. The first is literary. Roman and Greek military personnel, merchants, and travellers mention only two classes of Celtic society: an aristocracy composed of druids and knights, and commoners. The second source of evidence is archaeological. Three internally stratified classes have been identified: an aristocracy, an emergent middle class of artisans, bureaucrats, and merchants, and a lower class of rurally-based agriculturalists and urban migrants. The discrepancy between lines of evidence is discussed and a composite model presented. (18)

Culbert, T. Patrick, **VESSEL SHAPE IN CERAMIC ANALYSIS.** In some systems of ceramic analysis, vessel shape is treated as a secondary variable. This paper argues that any ceramic analysis that pretends to completeness must include a full investigation of vessel shape as an independent variable. Ceramic data from Tikal, Guatemala, indicate that vessel shape (1) is as important for traditional chronological purposes as ceramic type; (2) is more closely related to ceramic use than are types; and (3) provides quantitative measures of standardization in ceramic production that cannot be duplicated in the usual typological attributes. (5)

Dancey, William S., **RIVERINE PERIOD SETTLEMENT AND LAND USE PATTERN IN THE PRIEST RAPIDS AREA, CENTRAL WASHINGTON.** Survey data from the canyon and hill region adjacent to the Priest Rapids Reservoir on the Columbia River together with data from the floodplain reveal a pattern of differential land use and settlement distribution that appears essentially unchanged during the last 2000-3000 yr. (23)

Davis, Emma Lou, **HUNTING, WORK, AND LIVING PRACTICES OF EARLY AMERICANS.** Three years of fieldwork in China Lake basin, Mojave desert of California, have crystallized problems typical of desert surface archaeological sites and a system of accurate

techniques for coping with them has been developed. As a result, we are now in a position to formulate and test hypotheses about Paleo-Indian preferences in land use for hunting; for lookouts and for workshops; origins and changes in the present topography of this landscape; relations of early hunters to a local Rancholabrean fauna; and differences in locations favored for male and female workshop activities. (15)

Davis, Hester A., **TRAINING AMATEUR ARCHAEOLOGISTS.** Not every state has an organized group of amateur archaeologists, but a vast majority of them do and some have several. These groups have been doing and will continue to do archaeology, whether with professional leadership or not. There are thousands of people who are members of these organizations—a vast trainable resource. The professional archaeologists in several states have been providing field and laboratory training for some of these groups to one degree or another. In Arkansas we have provided field training for 9 yr, but only in the past 2 yr have we added to field and laboratory instruction for members of the Arkansas Archeological Society, a formalized program of training which results in Certification by the Arkansas Archeological Survey of individuals who complete the various categories of training requirements. We do not believe we are training pothunters to be more efficient—we believe—and have proof—that we are training lay archaeologists who will provide one of the answers to the present problems of protecting and recovering our archaeological resources. (11)

Davis, Jonathan O., and Robert Elston, **GEOLOGIC AND PEDOLOGIC CHRONOLOGY OF ARCHAEOLOGICAL SITES IN NORTHWESTERN NEVADA.** Stratigraphic evidence from recently excavated archaeological sites at Steamboat Springs (south of Reno) and at the margin of the Black Rock Desert (northeast of Reno) documents recurring post-Lahontan episodes of eolian deposition, erosion, and soil horization. Alternating sand deposition and surface hardening at the margin of the Black Rock Desert reflect an ephemeral Medithermal lake in the Black Rock Desert playa. At Steamboat Springs, eolian and colluvial deposition, and intervals of soil B horizon formation, reflect fluctuations in sediment sources. Radiocarbon and relative dating enables correlation with the Neoglacial sequence and with Holocene records from the Great Basin. (14)

Davis, Leslie B., **THE TWENTIETH CENTURY COMMERCIAL MINING OF GREAT PLAINS BISON KILLS.** Prehistoric bison kills were effectively destroyed in the northern Great Plains by bone mining for fertilizer and sugar and steel refining. This activity flourished as an industry during both World Wars and during the Depression, Montana was the primary center of exploitation and Alberta and the Dakotas received secondary attention by bone miners. The short term economic benefits are analyzed in relation to the waste of scientific and cultural resources. The bone mining phenomenon is viewed as a historical continuation of an adaptive strategy appropriate through time in this arid-variable, oft-times marginal environment. (38A)

Deagan, Kathleen A., **ETHNIC CONTINUITY IN FLORIDA: THE EASTERN TIMUCUA AND THEIR PREDECESSORS.** When the first Europeans arrived in Florida during the sixteenth century, they found the eastern Timucua Indians with a culture substantially unaltered from that of more than a millennium earlier. This long cultural continuity in the northern St. Johns region of Florida has been archaeologically and documentarily demonstrated; and the definition of this area as an ethnologically identifiable unit can be proposed through the application of the direct historical method. The adaptation of the eastern Timucua and their predecessors to a riverine-coastal environment, the internal structure of their culture, and the external relations with the rest of the Southeast are considered in an explanation of the processes of their development until the final decimation in historic times. (19)

DeAtley, Suzanne P., and Frank J. Findlow, **ON RAW MATERIALS USE AND ENVIRONMENTAL CHANGE.** The patterns of raw materials procurement of any cultural system are seen as adaptive responses that are sensitive to environmental change. A hypothesis designed to explain some of the operations of raw materials procurement during periods of environmentally induced stress is presented. Tests are made using patterns of prehistoric obsidian use in the Chevelon Drainage of Arizona, A.D. 900-1500. (41)

DeBoer, Warren R., **CERAMIC LONGEVITY AND ARCHAEOLOGICAL INTERPRETATION: AN EXAMPLE FROM THE UPPER UCAYALI RIVER, PERU.** The relative frequencies of various ceramic vessel forms in use at any one time may differ significantly from the relative frequencies of these same forms when projected into the archaeological record. One factor accounting for this difference is variable ceramic longevity; the shorter the life span of a particular vessel form, the more rapidly it will enter the middens studied by archaeologists. The observed and projected relative frequencies of vessel forms among the Conibo Indians of the Upper Ucayali are compared to the frequencies of antecedent forms in mortuary and midden archaeological samples from the Ucayali. The utility of ceramic longevity data in providing estimates for the population size needed to generate an archaeological midden is also explored. (30)

Dickson, D. Bruce, **LOCATIONAL ANALYSIS OF PREHISTORIC SETTLEMENT ON THE DUCK RIVER IN MIDDLE TENNESSEE.** This paper is an account of a test of certain hypotheses concerning locational stability and change in the prehistoric settlements of

middle Tennessee. A preliminary attempt is also made at generating polythetic definitions of settlement pattern during the Archaic and Woodland periods in the area. Data is drawn from the ongoing intensive reconnaissance being conducted on the Duck River by the University of Tennessee. (23)

Diehl, Richard A., TULA AND THE COLLAPSE OF THE MESOAMERICAN CLASSIC. The evidence for Tula's participation in the demise of Teotihuacan and Classic Maya societies is examined. There is no solid evidence at present that Tula was a functioning center at A.D. 750, thus it could not have contributed to Teotihuacan's downfall. It is possible that some of the personnel who helped defeat Teotihuacan eventually settled at Tula. It is also possible that some Tula-based Toltecs intruded into the Maya area and were involved in the collapse of Classic societies there. (27)

Dillehay, Tom D., SHIFTING RANGES AND SUCCESSIVE FLUCTUATIONS OF BISON POPULATION DENSITIES ON THE SOUTHERN PLAINS DURING THE LATE QUATERNARY. The Archaeological record of the southern Plains was thoroughly examined for the presence or absence of bison bones. The results were that 2 primary temporal spans from about 6000-5000 B.C. to 2500 B.C. and A.D. 500 to A.D. 1200-1300 were characterized by the absence of any species of the Genus Bison in the area. Two alternative concepts are presented as explanations for these changes in bison populations. One concept is that these animals shifted their ranges by migrating either partially or completely to areas beyond the southern Plains. The other is that the density of bison populations may have decreased dramatically, causing a very substantial reduction in the economic exploitation of these animals in some areas. (44)

Downing, T. E., WILL COMPUTER SIMULATIONS IMPROVE ARCHAEOLOGICAL THEORIES? Common metatheoretical difficulties face archaeologists and cultural anthropologists when they model cultural dynamics. I question if computer simulations offer any unique solutions to overcoming these difficulties. If they don't, then no matter how elegant, elaborate, or analytic their simulations, anthropologists might better spend their time playing with their other tools. (24)

Drover, Christopher E., EARLY CERAMICS FROM COASTAL, SOUTHERN CALIFORNIA. Initial excavations of 4-ORA-64, a site located on the east bluff of upper Newport Bay, were undertaken by a class from California State University, Fullerton, in 1971. Excavations revealed a large, early Milling Stone Horizon site with an unusual artifactual assemblage including fired-clay ceramics associated with early Carbon-14 dates. A grant from the Irvine Co. was established to verify this chronology which extends 4000 yr B.C. Discussion will be made of the approach to the problem, analytical techniques, and the analytical results. The artifactual assemblage, specifically ceramics, will be considered in light of North American prehistory. (38A)

Duffield, Lathel F., and Louise M. Robbins, MR DEFICIENCY: A PREHISTORIC DISEASE? (44)

Duffield, Lathel F., PHYSIOGRAPHIC PROVINCES AND KENTUCKY PREHISTORY. (44)

Dunnell, Robert C., THE NORMATIVE STRAW MAN: AN OBLIQUE DEFENSE? With increasing frequency archaeologists dichotomize the notion culture into "normative" and "systemic" concepts in discussing the rationales of traditional and modern approaches. Many deficiencies of traditional approaches in both recovery and interpretation are attributed to the normative view. While the deficiencies cited and the contrast of the systemic view are apparent, the normative concept of culture appears to be a post hoc rationalization by the holders of the systemic view. Other accounts for traditional practice may prove more useful in guiding innovation than the attribution of this particular notion as the prime mover in recovery and interpretation. (17)

Dwyer, Edward B., and Jane P. Dwyer, EARLY URBANISM IN THE DEPARTMENT OF CUZCO, PERU: INQUIRY AND ENIGMA. It is argued that ample evidence exists, both in the literature and as a result of recent fieldwork, to generalize on the nature of developing highland settlement and economic systems which required centralized political authority. A model is presented in an attempt to characterize this development as one of early dependence upon domestication of animals, the growth of urbanism as a residence pattern, and the ultimate necessity for hillside terracing and irrigation projects. It is suggested that in Cuzco this was an Early Horizon event which was not greatly influenced by the spread of Chavin culture. (32)

Earle, Timothy K., HAWAIIAN IRRIGATION IN THE HALELEA DISTRICT, KAUAI. The extent and intensity of irrigated taro production is described for a traditional political unit, the Halelea District, Kauai. The significance of this subsistence production in regional economies, chiefly control hierarchies, and population distributions is examined. (10)

Eddy, Frank W., PUEBLO SETTLEMENT ADAPTATIONS IN THE UPPER SAN JUAN BASIN OF NEW MEXICO AND COLORADO, A.D. 1-1125. Changes in Anasazi-Pueblo settlement distributions of the upper San Juan Basin are described and explained in terms of

a compromise strategy model. This adaptive model posits that settlement location will be a compromise among sets of opposing natural considerations affecting the agricultural basis of society. Among these factors, soil moisture and length of growing season were the most determinant to settlement location along a xeric to mesic, elevational gradient. (23)

Edwards, William Ellis, CLASSIC MAYA DECLINE BY POSTULATED SLASH AND BURN SOIL OVERUTILIZATION. (37)

Edwards, William Ellis, DETERMINANTS OF PRODUCTIVITY AND POPULATION WITH VARYING ENVIRONMENTS AND ECONOMIES. To avoid consumer-consumed food-gathering equilibrium, with selectively disadvantageous malnutrition and extreme sparsity, the population ceiling, food-procuring efficiency, or consumption tend to change. The interrelations among these, with implications for choice of food-producing techniques under various ecological conditions, is analyzed, and examples given. (1)

Ekholm-Miller, Susanna, PIEDRA PARADA, CHIAPAS. In 1945 Matthew W. Stirling carried out archaeological investigations at Piedra Parada, near Ocozocoautla, Chiapas, and the New World Archaeological Foundation has undertaken joint analysis with Dr. Stirling of the data gathered during that project. The site seems to have been occupied from Late Preclassic times through a modern Zoque Indian occupation. Of particular interest is the co-called acropolis or Mound 1, which underwent unusual architectural development during the early Classic. (43)

Epstein, Jeremiah F., AZTEC CORE-BLADE TECHNOLOGY. Over the past several years, a very extensive collection of obsidian core-blade materials from the site of Tlateloco has been analyzed. As a result, new data are now available on the core-blade technology of the Aztec period. (38)

Ericson, Jonathon E., PREHISTORIC TRADE IN CALIFORNIA—A PRELIMINARY STUDY. Surface trend analyses and computer contour mapping of obsidian artifact data were used to preliminarily describe the prehistoric trade patterns in California. These results and ethnographic data were used to test some deductive models, derived for the reconstruction of the trade systems of hunters and gatherers in California. (21)

Fagan, Brian M., CAN'T THOU DRAW OUT LEVIATHAN WITH A HOOK? AN ESSAY IN THE TEACHING OF INTRODUCTORY ARCHAEOLOGY. The teaching of archaeology at the introductory level poses many complex problems related to the content of the subject, purpose, and goals of the course, character of the students, and the methods to be used. This paper considers the short and long range objectives of teaching archaeology to large numbers of students, most of whom will not become professional archaeologists. Various options for teaching introductory archaeology are examined and the paper concludes with a summary of 5 yr of research on the topic. (42)

Fairbanks, Charles H., ARCHAEOLOGY OF THE FLORIDA SEMINOLE. Documentary sources indicate the changes which took place in Seminole material culture and settlement patterns during the eighteenth and nineteenth centuries. To some extent archaeology has been able to confirm the shift away from cohesive, town-square villages toward a more diffuse settlement pattern, perhaps due to the assumption of European-American farming methods. Ethnographic descriptions of changes in Seminole house types during the eighteenth century are much more difficult to verify archaeologically due to the lack of precise, extensive excavations of sites involved. The documentation of Seminole artifact inventories, however, has been possible. Changes following the Second Seminole War when the Seminole moved into the Everglades and Big Cypress Swamp areas have not been investigated by any systematic archaeology, although it is possible to describe the changes in subsistence, settlement plan, and material culture from ethnohistoric sources. Neither has it been possible to distinguish material culture differences that can be related to the 2 major language groups among the Seminole. (19)

Feldman, Lawrence H., and L. R. V. Joesink-Mandeville, AN ETHNOHISTORIC RESTORATION OF "AZTEC" III AND IV POTTERY. Nahua speakers of prehispanic central Mexico had over 70 terms for different containers. In this paper the principles governing the native system of nomenclature are presented and a collation is provided of these terms, their definitions in the old dictionaries, and pictorial representations in codices prepared according to prehispanic stylistic conventions. The archaeologist has found ceramic fragments of these objects of native attention. Here an attempt is made to identify and reconstruct some of these archaeological artifacts with the aid of the ethnohistoric record. (5)

Feldman, Lawrence H., A TALE OF TWO STONES: FLINT AND OBSIDIAN IN THE ETHNOHISTORY OF MESOAMERICA. This paper is a survey of obsidian and flint usage in Michoacan, central Mexico, north Yucatan, and the central Guatemalan highlands. Definitions and descriptions in the native language vocabularies define the different use patterns for these flakeable stones. References are cited on the origins of these stones and the techniques involved in processing them. Many of the same rocks were ground and polished by a group of specialists, the lapidarists. Information on the organization of these

craftsmen is presented in the hope that, to some extent, they reflect the organization of all who made flint and obsidian artifacts in sixteenth century Mesoamerica. (38)

Fenenga, Franklin, PUBLIC WORKS ARCHAEOLOGY IN CALIFORNIA AND NEVADA. (14)

Findlow, Frank J., Suzanne P. De Atley, and Jonathan E. Ericson, A TENTATIVE HYDRATION RATE FOR THE OBSIDIAN FROM THE BORAX LAKE OBSIDIAN SOURCE. Previous work has shown that useful hydration dating schemes are possible even in areas of complex volcanic histories if allowance is made for the variations in obsidian chemistry and the concomitant variation in hydration rates. To determine the hydration rate for the Borax Lake obsidian source, archaeological obsidian from Lak-261 was first analyzed by X-ray fluorescence to control source variation. Then hydration analysis was carried out on all the samples from the Borax Lake source that were in direct association with charcoal dated by the Carbon-14 method. The tentative rate for this source was subsequently applied to archaeological obsidian samples from the Borax Lake site. (15)

Ford, Richard I., TRAINING IN ANTHROPOLOGICAL ARCHAEOLOGY AT THE UNIVERSITY OF MICHIGAN. For more than 40 yr the Museum of Anthropology has trained undergraduate and graduate students in the field and laboratory techniques for solving archaeological problems. Although the museum is not a degree granting research institution, staff members hold appointments in the Department of Anthropology, a separate teaching unit. Classroom instruction, field experience, and laboratory research are coordinated for achieving common goals. University courses serve as the basis for teaching both theory and data. The museum offers an opportunity for students from any department to participate in ongoing laboratory research throughout the year. For graduate students, this research is directed with problem-solving as the basis for the training. Finally, the museum attempts to give undergraduate archaeology students field experience on one of its many excavation or survey programs. All graduate students have field opportunities all year long and are encouraged to participate in excavations in at least 2 continental areas. The means, funding base, and accomplishments of this ambitious program will be discussed. (42)

Forsyth, Donald W., CERAMIC STRATIGRAPHY AND OCCUPATIONAL SEQUENCE AT EDZNA, CAMPECHE, MEXICO. In connection with the investigation of ancient hydraulic systems at the Maya site of Edzna, Campeche, Mexico, a test program was undertaken to determine the occupational sequence of the site, as this was revealed by the ceramic stratigraphy. This paper reports the results of this program to date. It has been determined that the occupational sequence at Edzna spans a period from Late Preclassic times through Terminal Classic times. (38A)

Fowler, Don D., and Harold Klieforth, HOLOCENE CLIMATIC CHANGES IN THE GREAT BASIN: CORRELATION OF REGIONAL SEQUENCES AND REEVALUATION OF PREVIOUS CLIMATIC MODELS. (12)

Fowler, Melvin L., THE LATE PRECLASSIC OF THE VALLEY OF PUEBLA: SETTLEMENT SYSTEMS, LAND USE, AND URBANIZATION. The valley of Puebla in Central Mexico was extensively occupied in the period from 600 B.C. to A.D. 200. The characteristic site is a terraced hilltop with mounds surrounding a plaza. The slopes of the hill were often terraced perhaps for habitation. A less common type of site was a mound group and plaza on the valley floor. It is suggested that this latter type of site are central sites tying together group of hilltop sites. Ceramic and other cultural debris suggests an extensive occupation of the valley outside of the central communities. Systems of water control for irrigation or other purposes were well known. This system of settlement and implied social-political organization is contrasted with the Middle Preclassic and Classic of same area and comments are offered on the processes of development of complex societies and population nucleation. (18)

Fredrickson, David, A., CULTURAL DIVERSITY IN EARLY CENTRAL CALIFORNIA: A VIEW FROM THE NORTH COAST RANGES. Investigations in the North Coast Ranges have added to accumulating data which suggest that the traditional central California cultural sequence of Early, Middle, and Late Horizons, is a limited regional rather than a synthetic areal sequence. The North Coast Ranges investigations, together with work already reported from San Francisco Bay and the Lower Sacramento Valley, provide data on radiocarbon dating, obsidian hydration measurements, stratigraphic relationships, and artifact comparisons which suggest that a model of interregional diversity is more appropriate for the earlier time periods in central California than the traditional model which emphasizes transregional homogeneity. (31)

Freeman, L. G., THE VIEW FROM THE CAVE: THE TRAINING OF PALEOLITHIC PREHISTORIANS AND PALEO-ANTHROPOLOGISTS IN THE NEW WORLD. A specimen program for the training of paleo-anthropologists and prehistorians for Old World research is presented. No department of anthropology unites the conditions necessary to implement such a program alone. Factors affecting this kind of training are the interdisciplinary and international nature of such research and the relatively high costs for transporting trainees to the field. These special requirements impose especially high selective pressures on trainees and, as a result, insure that the population of professionals maintains

itself below the level of current and projected demand. A further disadvantage to students in this country is the lack of centers with facilities and staff from the spectrum of essential disciplines. Some remedies are foreseen but they will involve a certain degree of dissolution of inter- and intra-institutional boundaries which are now rather jealously defended. (42)

Frisbie, Theodore R., NEW PERSPECTIVES ON SOUTHWESTERN PUEBLO TRADE RELATIONSHIPS. Pueblo trade has been a constant feature in archaeological reports with "object orientation" as the primary goal. This paper is based on an archaeo-ethnological model which attempts to isolate the mechanisms of trade phenomena at various levels of abstraction. Consideration is given to reciprocity versus trade, intra- versus extra-village relationships, Pueblo versus non-Pueblo relationships, raw versus finished materials, and prehistoric-historic fixed value commodities, i.e., money. Inferences drawn through the use of analogy suggest that a multi-component network of trade relationships is observable in the archaeological record. (36)

Frison, George C., PRACTICAL CONSIDERATIONS IN THE ANALYSIS OF TOOL USE. Large communal animal kills provide evidence of intense and specific tool use. Analysis of the skeletal remains, tools, and sharpening debitage recovered indicate many continuities and many differences in butchering techniques through time and from one cultural group to another. Some of these differences may be cultural and some may reflect differential access to raw materials. Applying the results of these analyses to experimental butchering situations provides working hypotheses regarding tool manufacture, hafting, use, sharpening, and other considerations. (2)

Fritz, John M., MODELS FOR PREHISTORIC SUBSISTENCE SYSTEMS. The creation, explication and systematization of categorical and theoretical systems for past subsistence systems and for their material indicators in the archaeological record are necessary conditions for the expansion of empirically confirmed knowledge of such systems. Categorical systems for productive organizations and sequences of organizations have been explicated and applied in the generation of a set of models for a subsistence system existing in east-central Arizona at about 70 B.C. These categorical systems are defined and their application is exemplified by the description of a model for an animal procurement system. The usefulness of these systems and the implications of their application for the testing of models and for the development of subsistence and archaeological theory are considered. (41)

Fry, G. F., and J. M. Adovasio, HUMAN ADAPTATION DURING THE ALTITHERMAL IN THE EASTERN GREAT BASIN. Recent data from various lines of inquiry strongly indicate the existence of an Altithermal interlude in the eastern Great Basin. However, the local effects of this climatic episode do not appear to have had substantial impact either on human adaptation or settlement patterns in this area. The utility of the Altithermal as an explanatory or causal mechanism in archaeological interpretations in this sector of the Great Basin is therefore rejected. (12)

Fry, Robert E., and Scott C. Cox, LATE CLASSIC POTTERY MANUFACTURE AND DISTRIBUTION AT TIKAL, GUATEMALA. New information on the internal structuring of Maya sites has been produced through the use of multi-dimensional scaling techniques. Analysis of ceramics from Late Classic phases at the major Maya site of Tikal demonstrates how the distribution of attribute classes can be used to define community boundaries. Residual variability in ceramic collections is explained primarily through the effects of social class distinctions. (5)

Fryman, Frank B., DATA BANKS ON THE STATE LEVEL WITH PROPOSED FEDERAL COORDINATION OF VARIOUS PROGRAMS. The computerized archaeological data bank and some of its applications are briefly reviewed, with emphasis on the development of a state-level data bank. In Florida, a data bank is being compiled containing information on all recorded prehistoric and historic sites in the state. This data base is being accumulated primarily from an ongoing state-wide survey of all significant sites for input with relay into a cooperative program with the National Park Service's National Register of Historic Places in Washington. In addition to the site data, all of the artifact data from site surveying or excavation plus all historical artifact data being acquired for a history of Florida museum are being stored in Florida's data bank. Thus, the agency is being provided with a comprehensive data base for input to programs protecting and preserving Florida's historical resources, and in interpretative research. (3)

Gaines, Sylvia W., A PRAGMATIC APPROACH TO ARCHAEOLOGICAL DATA BANKS. A pragmatic approach to implementing archaeological data banks at the level of individual universities by utilizing available hardware and software is considered. The concept of independent data banks within the framework of larger networks is being developed. Access by remote terminal to each independent data bank is explored and the potentials of such an approach are evaluated. (3)

Gibson, Robert, MONACHE MEADOWS AND COLD AIR DRAINAGE—A HYPOTHESIS. Archaeologists are often concerned with the explanation of the settlement system in a given area. A number of variables have been examined in order to better understand why archaeological sites are located where they are. Some of these include proximity to water,

proximity to exploitable resources, edaphic conditions, available site area, nearness to trade routes. From a recent survey of Monache Meadows another variable, cold air drainage, seems to be operating on site distribution in this area. (23)

Gilman, Antonio, APPROACHES TO THE STUDY OF THE NEOLITHIC OF THE MAGHREB. The Neolithic period in the Maghreb has usually been studied in narrowly culture-historical terms. Features have been analyzed to demonstrate the derivation either of specific European traits from North Africa or of North African traits from Europe. It is suggested that the importance of the Maghreb culture area for later European prehistory is the contrast which the cultural stability of the former presents to the progressive culture change of the latter. Examination of evidence for the Early Neolithic of the western Maghreb suggests possible factors underlying this broad difference. (25)

Glennan, William S., THE BAKER SITE—AN EARLY LITHIC ASSEMBLAGE FROM THE MOJAVE DESERT. The Baker site, located to the west of Pleistocene Lake Mohave, has yielded an assemblage of surface collected chipped stone artifacts. The temporal and cultural placement of the Baker site and its associated artifacts is based on the location of the site, its relationship to Lake Mohave, other sites in the area, and raw material sources, the character, form, frequency, and raw material of the various types of artifacts, and the known cultural sequence for the Mojave Desert. Preliminary investigations indicate that the artifacts reflect an occupation of the site 10,000 or more years ago. (15)

Gorman, Frederick, and William L. Rathje, BEEF AND BOOZE II. Our project (Beef and Booze II) investigates contemporary purchase, consumption, and discard of meat and liquor in terms of Ayres' variables (ethnicity, household income, and number, volume, and cost of commodities). Differential patterning of meat and liquor consumed in an urban environment is viewed here with regard to a larger continuing project which is currently attempting to determine relationships between modern material refuse (household garbage) and relevant census and other elicited survey data. The results of both projects (Beef and Booze I and II) are compared to derive trends which characterize a century of meat and liquor consumption in an urban environment. (9)

Gould, Richard A., CONTINUOUS AND DISCONTINUOUS MODELS IN ETHNO-ARCHAEOLOGY. Ethno-archaeology, as a general approach, has been widely used (and sometimes misused) in the past. An effort is needed now to make this approach more scientifically self-conscious. Several aspects of ethno-archaeology are discussed here with reference to cases drawn from Australia and California; "living archaeology" versus ethno-archaeology, archaeological visibility, the site-oriented approach, native versus "archaeological" classification of artifacts, etc. These problems can best be viewed in terms of a framework which distinguishes between continuous models, in which there is stratigraphic continuity between the ethnographic adaptation in an area and archaeological sequences for that area, and discontinuous models, where ethnographic adaptations from areas distant from the scene of excavation are being compared and where there is no stratigraphic continuity. (17)

Graybill, Donald A., PREHISTORY AND LOCATIONAL ANALYSIS IN THE MIMBRES REGION, NEW MEXICO. Empirical regularities discerned in the size and spacing of prehistoric sites in the Mimbres Region of New Mexico are considered from theoretical and analytical perspectives. An archaeologically-specific Central Place Theory is discussed. The apparent operation of a site rank size rule is treated from the viewpoints of comparison and explanation. (23)

Grayson, Donald K., THE NIGHTFIRE ISLAND AVIFAUNA AND THE ALTITHERMAL. The Nightfire Island site, on northern California's Lower Klamath Lake, was occupied from approximately 4000 B.C. to A.D. 1400. Analysis of the avifaunal remains from this long occupation suggests that between 4000 B.C. and 2200 B.C. Lower Klamath Lake levels were higher than during subsequent years represented at the site, 2200 B.C. to A.D. 1400. This in turn suggests that the traditional model of postglacial climatic history, which includes a hot and dry Altithermal period between approximately 5000 B.C. and 2500 B.C. does not apply to this area of the Desert West. Neither analysis of the mammalian remains from Nightfire Island nor previous palynological and archaeological studies in the Lower Klamath Basin seems to test these conflicting hypotheses concerning the reality of a hot and dry Altithermal in the Lower Klamath area. (4)

Greaves, Thomas C., THE ECOLOGY OF UNCERTAINTY: RESPONSE TO A DISASTROUS FLOOD BY AN AGRARIAN ANDEAN COMMUNITY. The disastrous flood suffered by a water-scarce Andean agrarian community asserts that our usual ecological model should systematically include short-term risk. These case materials illustrate the following: (1) societies respond to risk through culture; (2) societies evince risk-taking strategies with their environment which set and can change the level of risk; (3) when the risk strategy fails the society marshalls contingency plans, may revise its risk strategy, and contains threats by compartmentalizing them. Hence the short-run aspects of an ecological model appear to be as necessary in accounting for cultural behavior as are the long-run aspects. (1)

Green, Dee F., DATA BANKS AND SPECIFIC RESEARCH DESIGN. THE SARG EXAMPLE. Problems of data bank design are considered for regional cooperative research of the kind being tried by the Southwest Anthropological Group. These problems include general systems versus specific systems, open versus closed systems, program compatibility, hardware and software requirements, data bank control and use, and system design. The data bank concept is discussed in relation to the long term research orientation of SARG and its evolving research design. Status of the SARG data bank is discussed along with comments on data bank usage by members of the SARG research team. (3)

Greengo, Robert E., SETTLEMENT PATTERN SURVEY IN NORTHEASTERN GUERRERO, MEXICO. This paper represents a first approximation in the analysis of settlement data collected in 1967, and is part of a long term study of land use in the region. Sixty-two sites are included in the present sample of which most (55) are in the drainage of the Rio Tepecoacuilco, while the other 7 are drained by the Rio Amacuzac, both being tributary to the Rio Balsas. Data are classified by site type, size, elevation above sea level, and type of terrain. The largest proportion of sites (53 or 84.5%) were noted as having mounds, structures, building foundations, and sherds. With regard to cultural period, it is clear from the preliminary survey that sites of both the earliest period, Preclassic, and the latest, Aztec, range through the extremes of terrain types delineated in the study. More intensive survey is projected for more detailed control of cultural and ecological variables. (13)

Griender, Terence, THE EARLY INTERMEDIATE SYSTEM OF IMAGES SEEN FROM PASHASH. Two systems of images were established in the Andean region. The first in Chavin, emphasized non-objective signs (S-curve, equal-arm cross) and multi-animals. The second, founded in the Early Intermediate and persisting into the Late Horizon, centered on a purely human figure surrounded by feline-serpents, often double-headed, and birds. The human, usually frontal, may have superhuman traits (fangs), but often is indistinguishable from a warrior. Use of this system from Tiwanaku to San Agustin indicates widespread intellectual contacts, despite abundant evidence of warfare and its glorification in the images. (32)

Griffin, James B., A REVIEW OF THE SIGNIFICANCE OF THE FEDERAL PROGRAMS IN ARCHAEOLOGY. From the first relief labor archaeological excavation at Marksville, Louisiana, in August, 1933, to the end of the programs about 1942, a great many archaeological sites were surveyed and excavated in the United States with support from the Federal Government. This was certainly the most productive 10 yr period that American archaeology has had in terms of acquisition of data, development of a chronological framework, and recognition of extensive inter-areal relationships. A large number of important publications resulted from this work and many current archaeologists participated in the programs. (14)

Griffin, James B., THE SOURCE OF HOPEWELLIAN OBSIDIAN AND ITS DISPERSAL PATTERN IN MIDDLE WOODLAND SITES. For many years archaeologists attempted to ascertain the source of obsidian found in Hopewellian sites in Ohio and in Illinois. While sources in Mexico, the Southwest, and even in Peru had been suggested, the most reasonable source identified by most archaeologists was the Yellowstone area. Neutron activation studies at the University of Michigan strongly indicate that the Yellowstone region was indeed the source. In Ohio there is a high concentration of the obsidian in one or two of the major Hopewell sites and in Illinois and Upper Mississippi Valley there is a small amount of material found at a larger number of sites. Indications are that the obsidian was not a part of a well-organized economic exchange or trade system, but that other explanations must be sought for the meaning of the pattern of its distribution. (21)

Griffin, P. Bion, HUNTERS IN THE HUMID TROPICS: ETHNOARCHAEOLOGY OF EBUKID AGTA. The Ebukid Agta are hunter-gatherers in the Sierra Madre of Isabella, Luzon, the Philippines. Unlike the Tasaday, they are successful exploiters of the larger jungle fauna, and follow a seasonal round of subsistence activities, with changes in resources, settlements, and amount of contact with non-Ebukid. I will offer a preliminary model of the Ebukid subsistence system and outline objectives of future ethno-archaeological research. (17)

Gross, Daniel, CARRYING CAPACITY AND POPULATION DYNAMICS IN THE AMAZON BASIN, AN ALTERNATIVE VIEW. (1)

Grossman, Joel W., LONG DISTANCE TRADE AND IDEA EXCHANGE DURING THE INITIAL PERIOD. Until recently the Initial period has been drawn as being a time of regional isolation with little or no interaction between the various early pottery making peoples of the Andean area. However, recent work in the south central highlands has provided evidence which supports a more fluid situation. The analysis of a new Initial period style, Muyumoqo, from the site of Waywaka in Andahuaylas, suggests that a wide-ranging pool of commonly held ideas may have existed throughout the central and southern regions of Peru during the first 2 millennia B.C. This is indicated not only by general features of ceramic design but also by close parallels in specific features of design between pottery styles found as far apart as the Chicama valley in the north and the Cuzco basin in the

south. Furthermore, while indirect contact may have been a factor, several lines of independent evidence suggest that direct trade, or even possibly movement of groups, was taking place between both coast and sierra and between southern and central highlands at least as early as 1500 B.C. (32)

Gumerman, George J., THE RECONCILIATION OF THEORY AND METHOD: THE ROLE OF SALVAGE ARCHAEOLOGY. There no longer exists a dearth of theory in American archaeology. Instead, the crisis in archaeology today lies in the inadequate funding and the lack of personnel and time to test complex theories concerning the development of general laws pertaining to cultural systems. As a result, archaeological method has not kept pace with theory. I indicate that a framework already exists within the realm of salvage archaeology which would allow researchers to use the large funding available to salvage archaeology for restructuring field and laboratory research. Both large and small projects could be structured toward theory testing, thereby facilitating the melding of archaeological method with theory. (29)

Haag, William G., THE TENNESSEE VALLEY AUTHORITY ARCHAEOLOGICAL PROGRAM. The origin of TVA's involvement in archaeology is an integral part of the whole development of federal aid to archaeology. The years 1934 to 1942 saw sites excavated that exceed in number all the scientific excavations that had ever been done before in the United States. The obstacles that had to be overcome were numerous also, not the least being the image that archaeology was dilettantism and the use of that manpower would be better spent on road construction. Most of the driving force behind the TVA program came from one man, W. S. Webb, but there were trained archaeologists to structure the fieldwork, the New Archaeology of that generation. Most of the excavations have been described, but analyses and interpretations are greatly limited. (14)

Hall, Edwin S., Jr., and Robert A. McKennan, AN ARCHAEOLOGICAL SURVEY OF OLD JOHN LAKE AREA, NORTHERN ALASKA. During the summer of 1972, a survey in the area of Old John Lake, near Arctic Village in the eastern Brooks Range, resulted in the discovery of 42 sites. Most were chipping stations, although the presence of bone meal and domestic tools at some suggests short-term campsites associated with caribou hunting. Recovered artifacts include Campus and other cores, numerous microblades, fish-tail and other projectile points and scrapers. A preliminary analysis of the recovered artifacts suggests correlations with material from the Lower Bench site at Cape Krusenstern and a dating of around 5000 yr ago. (7)

Hammond, Norman, ARCHAEOLOGICAL INVESTIGATIONS IN NORTHERN BELIZE (BRITISH HONDURAS). 1973. The results of excavation, site mapping, and ecological survey to date are presented in a preliminary descriptive report. (43)

Harlan, Mark, TRADING SPHERES IN PREHISTORIC MESOAMERICA. This paper examines evidence for the existence of distinct spheres of trading activity in prehistoric Mesoamerica. The primary body of evidence considered is ceramic. An attempt is made to define the boundaries of these trading spheres and to adduce the nature of their operation. The similarity of this construct to the concept of "ceramic sphere" utilized in type-variety analysis is noted, but the differences between the two concepts are also considered with particular attention to their differing implications for behavioral reconstruction. The more general implications of the model are examined and some suggestions are made for further research. (36)

Harper, K. T., CLIMATES OF THE LAST 10,000 YEARS IN THE NORTHEASTERN GREAT BASIN AS INFERRED FROM CULTURAL DEPOSITS IN CAVES. During the past score of years, the cultural deposits of a number of caves in the northeastern Great Basin have been excavated. A rich diversity of biological remains from strata of known age have been identified by experts in many fields. Almost without exception, the species encountered in the deposits of the last 10,000 yr can still be found in the near vicinity of the caves. By combining a knowledge of modern ecological requirements of individual species with their relative abundance in the deposits, one can draw inferences concerning climatic conditions prevailing during the various periods of deposition. Based upon such evidence, a climatic sequence for the northeastern Great Basin is formulated and the supporting evidence presented. The sequence is compared with other climatic models and its implications for human ecology are discussed. (4)

Hatch, Marion P., A POSSIBLE CALENDAR IN THE MADRID CODEX. It is shown that the pictures accompanying the 260-day count on pp. XII to XVIII in the Madrid Codex correlate very well with the appearance of certain constellations as they would have been observed after sunset as the year progressed. It is suggested that these pages deal with a "serpent calendar" and that the Chicchan serpent may have had, among other attributes, an astronomical-calendrical connotation. Some data is given to illustrate why such a calendar may have been important, along with ethnographic information to support the argument. (43)

Hauck, Forrest Richard, THE PRECLASSIC HYDRAULIC COMPLEX AT EDZNA, CAMPECHE, MEXICO. During the months of October through December, 1972, a variety of hydraulic systems were investigated at the Lowland Maya site of Edzna. These systems consist of canals, reservoirs and aguadas which were evidently constructed for the purpose

of drainage and manual irrigation. The canals vary from 12 km to 600 m long and the reservoirs range from 14 m in diameter to large constructions over 100 m in length by 60 m. The investigation of these hydraulic features was accomplished in 3 parts: an ecological study of climate, soil, and general aquatic life; a surface survey and mapping of several areas containing a variety of the hydraulic systems; and excavation at critical points for the purpose of determining temporal aspects, construction techniques, and land-use. (38A)

Hellmuth, Nicholas M., TEOTIHUACAN-COTZUMALHUAPA-VERACRUZ ART IN ESCUINTLA, GUATEMALA. Hundreds of whole Teotihuacan-like figurines, incensarios, candeleros, and cylinder tripods have been excavated recently throughout the coastal Escuintla plain of Guatemala. Some scenes on cylinder tripods are in pure Teotihuacan style, others are local coastal adaptations of Teotihuacan style, others are in a possibly proto-Cotzumalhuapa style, others have Veracruz-Chichen Itza-like ball game scenes, and others show persons attired in a strange coastal Oaxaca style. Several vessels have all these different styles in the same scene. This contemporaneity (ca. fifth to sixth centuries A.D.) may necessitate revising traditional dates for Cotzumalhuapa and (Toltec) Chichen Itza styles. (5)

Hoffman, Michael A., ARCHAEOLOGICAL EXCAVATIONS AT HIERAKONOPOLIS AND THE RISE OF THE EARLY EGYPTIAN STATE. Excavations and site surveys conducted at Hierakonopolis in Upper Egypt by the American Museum of Natural History in 1969 have revealed demographic and environmental evidence for human occupation of the region over the last 30,000 yr. Perhaps most importantly, information from Predynastic and Early Dynastic settlement patterns and paleo-ecology provides a new and more sophisticated picture of the emergence of the Egyptian state. It can be seen that a combination of factors, including both micro-climatic change and social organizational shifts, coincided at a point in time and generated the rapid development of state level organization in Egypt at the end of the fourth millennium B.C. (25)

Holder, Preston, HAVE SPADE; WILL TRAVEL—THE ARCHAEOLOGIST AS MIGRATORY WORKER. (14)

Holien, Thomas, and Robert B. Pickering, ANALOGUES IN A CHALCHIHUITES CULTURE SACRIFICIAL BURIAL TO LATE MESOAMERICAN CEREMONIALISM. Test excavations, in 1971, at the Alta Vista site in Zacatecas, Mexico, yielded an unexpectedly large amount of human bone. The condition, distribution, and selection of deposited and buried bone suggests ritualized dispatching as well as interring of individuals in this northwestern Mesoamerican culture of the Classic. One such burial includes a primary individual, without skull, and groups of stacked long bones of others, all young adults. Elaborate accompanying artifacts and osteological data readily conform to the projected residue of an Aztec Tetzcatlipoca sacrifice. The significance of this analogy as evidence for a cultural-historical connection is considered. (35)

Hester, Thomas R., TECHNOLOGICAL AND FUNCTIONAL ANALYSES OF OBSIDIAN ARTIFACTS FROM SOUTHERN MICHUACAN, MEXICO. Analyses of over 700 obsidian artifacts—cores, blades, bifacial and unifacial tools—provide new information on Mesoamerican obsidian-flaking techniques. Microscopic examination of wear patterns on tools in the collection have led to the development of hypotheses regarding their function. (38)

Heyden, Doris, CHICOMOZTOC IN TEOTIHUACAN? Analysis of the cave recently discovered underneath the Pyramid of the Sun in Teotihuacan, based on historical written sources and on an ancient cult to caves in Mexico. The cave is compared with the mythical Chicomoztoc, place of creation. I suggest it may have determined the site for the building of the Pyramid of the Sun and that later Aztec accounts of rulers being buried underneath the pyramid may have been based upon fact. Reference is made to excavations within the pyramid made by Millon, Drewitt, and Bennyhoff, and to their anticipation of a sacred pit or tomb within the earliest structure. (35)

Hibben, Frank C., PALEO-INDIAN AND DESERT ARCHAIC MANIFESTATIONS AT COMANCHE SPRINGS, NEW MEXICO. (15)

Hickey, Clifford, G., INPUT-OUTPUT (INTER-INDUSTRY) ECONOMICS OF ARCHAEOLOGICAL SYSTEMS. Input-output (or inter-industry) analysis is a matrix-analytical technique gaining wide use in formal economics. It is of particular use in situations involving technological change, and when comparing national or cultural systems from an economic viewpoint. Explicitly a "structural" approach to the modelling of economic phenomena, this method may provide a way toward the understanding of intensive and extensive economic relationships of archaeological societies. An application is made to a particular cultural tradition of northwestern Alaskan Eskimos, the Arctic Woodland culture. (21)

Hicks, Frederic, and H. B. Nicholson, THE CLASSIC PERIOD AT CERRO PORTEZUELO, BASIN OF MEXICO. The Classic period in central Mexico was dominated by Teotihuacan. It has been suggested that Teotihuacan played such a pervasively dominant socio-political role in central Mexico that few other centers of substantial size flourished at this time, perhaps as the direct result of Teotihuacan economic and population relocation policies. One site whose earliest phase was coeval with at least the later portion of the floruit of

Teotihuacan was Cerro Portezuelo, located about 23 mi to the south. The artifactual typology and architecture of Cerro Portezuelo's Classic period phase are summarized and comparisons are undertaken with the contemporaneous artifactual types and architectural remains at Teotihuacan and other relevant central Mexican sites. The nature of the relationship between Teotihuacan and Cerro Portezuelo is discussed within the context of the larger problem of possible sociocultural interactive mechanisms between Teotihuacan and other central Mexican communities. (35)

Hirth, Kenneth Gale, SOIL PHOSPHATE AND SETTLEMENT ACTIVITY: A MESO-AMERICAN TEST CASE? Although the known correlation of phosphate concentrations with abandoned human habitation areas has been discussed by scientists since the early 1930's, the use of these concentrations in the study of human settlement has been hindered by the length of time required to perform the laboratory process. This study uses a new technique of sample processing to test the applicability of phosphate analysis for use by archaeologists concerned with settlement activity. On the basis of tests from 2 Mexican archaeological sites, it is concluded that phosphate analysis can be used to find and compare areas of differential human activity when other traditional methods can not. (33)

Hommon, Robert J., ARCHAEOLOGY AND THE PRIMITIVE STATE: THE HAWAIIAN EXAMPLE. The Hawaiian primitive state hypothesis, which is supported by the ethnohistoric literature of the late eighteenth and early nineteenth centuries, states that at least one primitive state society had evolved in the Hawaiian Islands prior to European contact. As an alternative to the assumption that Hawaiian socio-political systems had not advanced beyond the chiefdom level before contact, this hypothesis provides a new framework within which archaeological research can be conducted. Recent emphasis on settlement pattern and ecological approaches has stimulated the study of problems related to this hypothesis such as the nature of Hawaiian social stratification, settlement nucleation, and agricultural intensification. (10)

Hubbard, Carol M., and John P. Malloy, POLITICAL AND ECONOMIC INSTITUTIONS IN LATE POSTCLASSIC SOUTHERN MESOAMERICA. Political and economic institutions of Late Postclassic southern Mesoamerica are examined in a diachronic reference frame. Attention is focused on political units in Tabasco, Yucatan, Cozumel Island, and the Bay of Honduras. Historical events occurring between A.D. 1250 and A.D. 1520 are correlated and inferences about inter-polity interaction are made. It is concluded that many historical events heretofore considered in isolation can be filled into an overall framework of inter-polity conflict and alliance. (40)

Hudson, Luanne, PREHISTORIC COMMERCE NETWORKS: A TYPOLOGY. A typology for determining the correlation among commerce networks, mechanisms of commerce, population density, and settlement patterns is presented. The model uses archaeological data and is quantifiable. It will initially be applied to data from the southwest United States, specifically the area around the Mogollon Rim. (36)

Hurley, William M., MULTIVARIATE ANALYSIS OF ORR FOCUS CERAMICS. Oneota Orr Focus ceramics excavated from the Armstrong site (47-Pe-12) in western Wisconsin date after A.D. 1000. Diagnostic specimens have been computer coded and subjected to histogram, matrix correlations, dendrogram, principal component and multivariate analysis of variance programs. The results of these taxonomic orderings will be compared and contrasted to standard typological results previously offered for Orr Focus ceramics. (26)

Hyman, David S., PREHISPANIC MESOAMERICAN CEMENTS. New information is provided on the concretes, stuccoes, and mortars utilized in pre-Columbian building construction. Field observations and comprehensive laboratory analyses of representative samples from Mexico and Central America form the basis of conclusions. Results indicate that cements derived from limestone rock were used exclusively in Mesoamerica; that additives, surface treatments, and hardeners were commonly employed; and that early Classic period products were quite technologically advanced. The question is raised concerning a Formative period development stage versus exotic introduction. (13)

Ingersoll, Daniel W., THE ASHMAN COMETH. Archaeological and non-archaeological artifacts and printed records relating to material culture are used to analyze contemporary popular attitudes toward the Spanish American War. Attitudes inferred from material culture are contrasted to ones implicit or directly expressed in political, governmental, or other historical accounts, contemporary and recent. It is concluded that the average American citizen (U.S.A.) approved of or favored imperialistic expansion and found the war and the new possessions a source of excitement and pride, even though many governmental sources attempted to emphasize moralistic and other non-imperialistic goals and ideals as justification for the war and the territorial additions. The dominant popular attitudes are seen as a major source of political support and for the retention of territories gained. (9)

Irons, William, SOCIAL CONVENTION AND POPULATION DYNAMICS AMONG THE YOMUT TURKMEN OF NORTHERN PERSIA. This paper examines evidence from a particular tribal group in northern Persia relevant to Wynne-Edwards' hypothesis concerning regulation of population size through social conventions. The specific proposition examined is that among this group certain social conventions limit fertility in such a way as to

maintain a stable balance between population size and the overall wealth of the tribe. After examining the data relevant to one specific group, the implications of this sort of evidence for an understanding of the general role of population growth in cultural development is discussed. (1)

Irving, W. N., STONE IMPLEMENTS FROM OLD CROW FLATS, Y.T. Of the several hundred stone implements from lookouts around Old Crow Flats, Northern Yukon Territory, all but a few can be assigned to types already known from Beringia. Blade and microblade industries are prominent. Significantly rare or absent are specimens from (a) Paleo-Indian traditions, (b) the Arctic Small Tool tradition, and (c) the late prehistoric Kutchin. The latter cultures are known to have been in the area, but evidently did not use lookouts as part of their hunting strategy, whereas others, probably including the Denali complex, did use them. The significance of certain types new to Beringia is discussed also. (7)

Irwin-Williams, Cynthia, MODELS FOR THE ANALYSIS OF PREHISTORIC TRADE PATTERNS. (21)

Irwin-Williams, Cynthia, and Paddy Clarke, THE DEVELOPMENT OF DATA STORAGE AND RETRIEVAL SYSTEMS IN ARCHAEOLOGY: THE SAN JUAN VALLEY ARCHAEOLOGICAL PROGRAM. One of the most serious problems in the investigations of large complex social entities in prehistory is simply the handling and effective analysis of the prodigious amount of data generated. Computer data storage and retrieval systems represent the only feasible solutions to these difficulties, and also present opportunities for the improvement of the network of communication within archaeology, by combining increased availability with increased comparability. Where possible, from the inception of research, every element of information handling, including all phases of field recording, various levels of laboratory analysis, and contributions of ancillary sciences, should be adapted to computer format. Particularly critical are the methods adopted for the structuring and description of data. It is essential to design structures which represent the maximum efficiency in trade-offs between machine-time and human-time expenditure, retaining flexibility. Examples are drawn from the San Juan Valley Archaeological Program in northwestern New Mexico. (3)

Isbell, William H., AN ALTERNATIVE THEORY OF THE ORIGIN OF ANDEAN STATES. Andean South America has been considered by Robert Carneiro (Science, Aug., 1970, pp. 733-738) as a sample case in the formulation of a theory of the origin of the state. It was argued that state institutions rise in response to offensive and defensive warfare in environmental situations where defensive retreat is prevented. Recent clarification of the economic basis of Andean states demands a reexamination of Carneiro's propositions and also provides a basis for an alternative formulation. The location of political centers and their sphere of influence provides information concerning the economic factors upon which Andean states were based, and suggest a pattern for understanding the initial elaboration of complex political institutions generally. (32)

Jack, Robert N., THE SOURCES AND PREHISTORIC DISPERSAL OF OBSIDIAN IN NORTHERN AND CENTRAL CALIFORNIA. X-ray fluorescence analysis of obsidian sources and more than 1500 obsidian artifacts from northern and central California has revealed widespread prehistoric trade of obsidian from at least 18 principal geologic sources in California and Nevada. (21)

Jackson, Thomas L., ON THE ECONOMICS OF OBSIDIAN TRADE IN CENTRAL CALIFORNIA. Recent applications of the X-ray fluorescence spectrography analytical technique have allowed archaeologists to determine the geographic source of artifactual obsidians. The method has demonstrated the presence of obsidian originating east of the Sierra Nevada as far west as the San Francisco Bay region. Distribution patterns for obsidian from various sources have been determined. Preliminary observations from early sites in the San Francisco Bay region suggest a possible shift in trade relationships between sources east of the Sierra Nevada to sources of the Napa region which later come to dominate in the Bay region. Possible explanations are presented. (31)

Jefferson, George T., A REEXAMINATION OF THE "PINTO BASIN SITE." Since the initial description of the "Pinto Basin Site," the questionable association of cultural materials and the remains of extinct Pleistocene vertebrates has not been adequately resolved. An analysis of faunal remains recovered in context with Pinto lithic artifacts indicates that paleoecologic conditions at the time of aboriginal occupation were not greatly different from the extant situation. An erosional unconformity representing a considerable time duration lies between the cultural debris and underlying lacustrine deposits which yield a late Pleistocene, Rancholebrean vertebrate fauna. (15)

Jelinek, Arthur, AN ANALYSIS OF THE MIDDLE AND LOWER PALEOLITHIC INDUSTRIES FROM THE TABUN CAVE EXCAVATION: SOME PRELIMINARY RESULTS. Between 1967 and 1971, over 40,000 lithic artifacts were recovered from over 60 depositional layers in the cave site of Tabun on Mount Carmel by the University of Arizona-University of Michigan Project. These materials range from Late Acheulian industries in the lowest levels to Levallois-Mousterian in the upper levels, and include

Yabrudian and Amudian layers in the middle levels. This paper will present some preliminary results of metric and qualitative analysis of a portion of this collection. (25)

Jelks, Edward B., THE USE AND MISUSE OF RANDOM SAMPLING IN ARCHAEOLOGY. In an effort to apply sophisticated statistical methods to archaeological problems, some archaeologists in recent years have devised various techniques for acquiring random samples of empirical field data. Many of these techniques are ineffective because they produce only a random sample of small objects from different parts of a site, not a random sample of all the cultural data contained within the site. The concept of random sampling is reviewed, misapplications of the concept in archaeology are enumerated, the theoretical basis for effective random sampling is discussed, and criteria for appropriate random sampling techniques in archaeology are presented. (28)

Jensen, Peter M., FORMAL ANALYSIS OF THE LEAF SHAPED POINT IN EARLY AMERICAN PREHISTORY. The leaf-shaped projectile points from various North, Middle, and South American sites are examined. Locally derived typologies are seen as tending toward internal consistency and consequently toward meaningful indicators of chonistic and cladistic relationships. More recent attempts to extend the designation "leaf-shaped" within the context of a postulated Pan-Cordilleran tradition appear unvalidated. Statistical procedures used in the recognition and formation of "types" are discussed, and a tentative "key" for the identification of the Ayampitn leaf-shaped point is offered. (16)

Jermann, Jerry V., A CONSIDERATION OF COMPUTER METHODS IN THE STUDY OF PREHISTORIC COMMUNITY PATTERN STRUCTURE. A methodological discussion of several different computer techniques for the characterization and elucidation of community pattern structure in archaeological assemblages is presented. Each method is assessed as to its utility and limitations in discriminating macro- and micro-community structures. The methods are illustrated by the examination of a late prehistoric town from eastern Kentucky. (18)

Joessink-Mandeville, L. R. V., MANI PATTERN BURNISHED WARE IN THE MIDDLE FORMATIVE: REASSESSMENT OF BRAINERD'S MANI CENOTE COLLECTION IN LIGHT OF HIS FIELD NOTES. The acquiring in 1971 of George W. Brainerd's fieldnotes concerning his excavations at Mani Cenote prompted a return to Merida to study his collections. The ceramic sequence in Trenches 1 and 2 was analyzed and the stratigraphic placement of pure deposits of Mani Pattern Burnished Ware in the bottom of these trenches was verified. Directly overlying these deposits in Trench 1 (levels D and E) is a level (C) yielding both water bottle and recognizable Middle Formative sherds, while the upper levels (A and B) abound in Late Formative pottery. Recent evidence from Dzibilchaltun and elsewhere is also utilized in collaborating the chronological placement of the Mani Cenote ware. (5)

Johnson, Alfred E., KANSAS CITY HOPEWELL HUNTING AND GATHERING TERRITORIES. Analyses of floral and faunal materials from Kansas City Hopewell sites indicate a subsistence economy based on hunting and gathering locally-available resources. Settlement pattern data are used to suggest a model of the nature of hunting and gathering territories. The validity of the model is tested by a consideration of stylistic variability of artifacts. (41)

Johnson, Ann S., TREND-SURFACE ANALYSIS OF RADIOCARBON DATES FROM WOODLAND SITES IN THE PLAINS. Trend-surface analysis is applied to radiocarbon dates from Woodland sites in the Plains, so as to discover the broad-scale spatial trends in these dates. The 5730 half-life, 5570 half-life, and Suess correction are used. The result is a heuristic, mathematical model. This model produces a topographic-like map summarizing the trend of the dates, from which inferences can be drawn about the Woodland as an archaeological entity. (44)

Judge, W. James, James I. Ebert, and Robert K. Hitchcock, TRANSECT SAMPLING IN REGIONAL ARCHAEOLOGICAL SURVEY. The Southwestern Anthropological Research Group (SARG) offers a great deal of potential to archaeologists interested in undertaking research at the regional level, and the importance of a reliable sampling design is well-recognized by its participants. This paper critically examines the recommended strip transect sampling design in light of the kinds of data required for the solution of the research problem central to the SARG design (i.e., why are sites located where they are?). Data from the archaeological survey of Chaco Canyon, collected in 1971 and 1972, are employed to test the reliability and effectiveness of strip (belt) transects in gathering data specifically relevant to the SARG research design. Alternative sampling techniques commonly employed in other disciplines are reviewed, and the SARG sampling design is evaluated in terms of the results of the testing. (28)

Kaschko, Michael, TRAIL SYSTEMS AND BOUNDARIES IN LEEWARD KOHALA, HAWAII. The leeward area of Kohala, Island of Hawaii, is a poorly dissected slope of geologically recent lava flows with few natural landmarks. This paper discusses the trail system which connects settlements along the shore with inland agricultural complexes. The trails appear to serve the purposes of communication and social boundaries. (10)

Katz, Paul R., THE LITHIC TECHNOLOGY OF A CERAMIC COMPLEX. Analysts agree that, because of its reductive procedures, the reconstruction of a lithic technology necessitates a concentration on debitage rather than, but not excluding, the shaped products. The fact that Kansas City Hopewell refuse pits are the only lithic-bearing units available for analysis which provide temporal, spatial, and cultural controls makes the employment of debitage not only desirable, but mandatory. One goal of my study is the establishment of a model for Kansas City Hopewell lithic technological processes, using observation, replication, and multivariate statistical analyses; another goal is the comparison of the interpretive value of the processes with that of ceramic studies for the same complex. The results of the study will be presented. (2)

Kautz, Robert R., POLLEN FROM HUMAN COPROLITES IN NORTHERN CHILE. Pollen extracted from human coprolites in archaeological contexts in northern Chile indicates the feasibility of such research as an adjunct to sophisticated ecosystem and economic archaeological analysis in that part of the world. Results are variable, depending on factors such as extraction technique and condition of the sample. Interpretation is affected by the above factors as well as accidental ingestion, time elapsed since eating, and the common factors of differential pollen production and destruction. (16)

Keatinge, Richard W., CHIMU CERAMICS FROM THE MOCHE VALLEY, PERU: ATTRIBUTE ANALYSIS AS A BASIS FOR SERIATING DOMESTIC POTTERY. The focus of this paper is toward setting up tentative yet reliable divisions within the Chimú sequence. The sequence presented is based on a seriation of excavated collections from several sites in the Moche Valley. An important feature of the seriation is that it is based largely on domestic ceramics rather than the fine funerary wares upon which other Chimú seriations are almost exclusively based. In order to give the seriation more than simply subjective validity, a computerized analysis was undertaken, applying selected statistical tests of significance and correlation to the data. (26)

Kehoe, Alice B., DERIVATION AND TESTING OF A MODEL OF CULTURE CONTACT FROM AN EIGHTEENTH CENTURY FUR TRADE POST. Data from the Francois-Finlay site, a contact-period (1768-73) "peddlars' " fur trading post on the Saskatchewan River, is used to construct an archaeologically-recognizable model of intercultural relations: when a colonial entrepreneur extracts a natural product obtained by the indigenous population, the native artifact classes show little distortion, the entrepreneurs' imports consist of 2 classes, (1) cheaply-transportable manufactured goods for trade, (2) easily-transportable identity images reinforcing the entrepreneurs' cultural identity. Tested against data from Carthage, Norse settlements, and others, the model can distinguish colonies from factories. (40)

Kelley, David H., COSTUME AND NAME IN MESOAMERICA. The Mixtec codices frequently show the same individuals, as indicated by their calendar names and genealogies, in different situations. In these, a person's name may appear as a separate glyphic drawing in one case and as part of his costume in another. It is not clear whether these costumes were actually worn or are merely a graphic device, but since the concept was present, some individuals probably did wear their names sometimes. Some Maya representations indicate the same practice. (22)

Kelley, J. Charles, and Ellen Abbott Kelley, THE RISE AND FALL OF THE CLASSIC AS SEEN FROM THE NORTHWESTERN FRONTIER OF MESOAMERICA. The rise and fall of the Classic is reflected, inferentially, in the culture history of the Northwestern Frontier. Exploitative occupation of the Chalchihuites area, coincidental with the maximum development of Teotihuacan, by an intrusive group whose ceramic art and ceremonialism links them stylistically and thematically with central Mexico suggests that the rise of the central Mexican Classic was accomplished by economic penetration and exploitation with military support and associated religious proselytism over an extensive geographic area. Contrary to some views, the cultures of the Northwest appear to be largely of Mesoamerican derivation and affiliation, although lacking visible Olmec characteristics. (27)

Kelley, James E., MAMMALIAN AND HERPETAFAUNA REMAINS FROM ANTELOPE HOUSE, CANYON DEL MUERTO. This paper will present an analysis of the faunal remains (excluding Avians) from Antelope House Ruin in Canyon del Muerto at Canyon de Chelly National Monument, Arizona. It will review the excavated skeletal material with an intention of interpreting the possible subsistence pattern at a habitation site occupied from the period of Basketmaker II to Pueblo III. (33)

Kelly, Roger E., THE ARCHAEOLOGICAL LABORATORY: STEP-SISTER OR CINDERELLA? A short survey study of departmental offerings and personal experience indicates that the pedagogy of American archaeology slights the laboratory. Lack of usable literature, the glamour of the field situation, and limited departmental capital combine to make the laboratory a step-sister of the field situation. With recognition of the scope and importance of laboratory research and redirection of effort, the laboratory could become as important as fieldwork for the teaching of anthropological archaeology. (42)

Kemrer, Meade, THE DEVELOPMENTAL CYCLE OF DOMESTIC GROUPS IN A PREHISTORIC PUEBLO COMMUNITY. Probable domestic social groupings are identified at Kiet Siet, a thirteenth century prehistoric pueblo in the Kayenta region of Northeastern

Arizona, through dendrochronological and architectural feature analyses. Relationships between the structure and expansion of domestic groups and pueblo growth at Kiet Siel are examined. Finally, the implications of this intra-site demographic analysis for testing hypotheses concerning in-migration, pueblo abandonment and environmental stress are explored. (18)

Kessler, Evelyn S., A PRELIMINARY DESCRIPTION OF CERAMICS FROM THE TOLAS OF OTAVALO, ECUADOR. In the summer of 1972, the author surveyed and tested sites in and around the town of Otavalo, in Highland Ecuador. Although the area abounds with large earthen mounds, called Tolas, it has not been investigated since 1912, when some work was done by Verneau and Rivet. Typical sherds from 11 test sites will be shown on slides, and described. Also, certain ceramics which appear to be trade ware will be shown. An attempt will be made to correlate these with the description of the "cara Phase," by Meggers. Future work in the area will more closely define the nature of the tolas, the society which supported them, and the time period to which they can be assigned. (45)

Kikuchi, William K., PREHISTORIC HAWAIIAN AQUACULTURE. Found on all islands and in all districts, the 12 types of the prehistoric Hawaiian aquacultural system were geographically determined or, where needed, artificially made. Fishponds were under conspicuous ownership. Accepted belief has been that the commoners benefited from these sizable supplies of protein, but recent research indicates otherwise. Because of the mobile nature of the court, aquaculture developed to provide a fresh, relatively abundant supply of preferred fish on demand. As the royalty began to mimic the Western way of establishing capitals and as the cash economy replaced the native economic system, aquaculture likewise began its decline. (10)

King, Chester, AN EXPLANATION OF DIFFERENCES AND SIMILARITIES OF BEADS. Differences in the dimensions of beads which are contemporary are related to the maintenance of separate flow networks connecting different energy stores. The use of different beads in different networks results in differential distributions of beads in mortuary contexts and in site contexts. Changes in the dimensions of beads over time can be described in terms of energy invested in manufacture and resulting show. Changes in beads can be either the result of (1) increased or decreased complexity within particular interaction networks resulting in either divergence or convergence of types used in the network or (2) changes in the cost of maintaining sufficient show to validate status which is related to the potential for participation in different networks. Application of the concept of a cost-show ratio in explaining the sequences of shell beads in different areas of California indicate continual growth of cultural systems accompanied by increased specialization of flow networks, increases in energy stored, and increased specializations of managerial roles. (31)

King, Thomas F., BUCHANAN V: A STUDY OF POLITICAL ORGANIZATION IN THE CENTRAL CALIFORNIA MIDDLE HORIZON. California hunter-gatherers may be considered typical of non-agriculturalists living in rich, varied environments, so considerable effort has been expended in recent years toward explicating their forms of political organization. Most such studies, however, have been hampered by poor data-bases, the possibility of "contamination" by contact with white culture, or both. A recent study of 1500 yr old cemeteries on the Chowchilla River in central California provides the basis for some new assessments. (31)

Kirch, Patrick V., EARLY SETTLEMENT AND PROBLEMS OF ADAPTATION IN HAWAII. Recent archaeological excavations on Oahu and Molokai Islands have provided evidence of Polynesian settlement by at least A.D. 600, on windward coasts in ecologically focal locations. Evidence from these early sites also suggests that the initial settlers possessed a fairly wide-ranging base of subsistence techniques, including shifting (dryland) and irrigated cultivation, animal husbandry, and marine exploitation. In this paper these data will be examined in terms of adaptation to high-island environments. Evidence for local intensification of agricultural systems will also be considered. The time period involved is roughly A.D. 600-1200. (10)

Klein, Joel I., THE RELATIONSHIP OF CHERT SOURCES TO ITS OCCURRENCE AT ARCHAEOLOGICAL SITES. The occurrence of a specific chert type at sites discovered during a 1972 site survey in west-central New Mexico by the Cibola Archaeological Research Project is described. Analytic techniques are discussed, and are employed in the preliminary testing of hypotheses concerning raw material distribution. The validity of a movement lapse rate model for cases dealing with limited geographic areas is considered. (34)

Knudson, Ruthann, EDGE MORPHOLOGIES AND FUNCTIONAL UNITS, AYACUCHO, PERU. Computer-assisted attribute analysis of patterns of edge characteristics on lithic implements was conducted this past year on 9-4000 yr old assemblages from the Ayacucho Valley, Peru. Concern with the multi-functional dimensions of most implements led to formulation of the "functional unit," that portion of an implement assumed to be appropriate for completion of particular task categories. Functional units, or FU's, were thus the units of analysis, rather than entire artifacts. Ultimately, edge morphology patterns will be used to delineate culture-historically significant variations in tool kits, and association of these with faunal and floral data should suggest patterns of site utilization. (20)

Kolb, Charles C., THE OLD SHELL GAME: A MESOAMERICAN TRADE NETWORK. Quantities of unworked marine shell from both the Panamanian and Caribbean Marine Faunal Provinces were recovered from excavations and surveyed sites in the Teotihuacan Valley, central Mexico. The bulk of the material was associated with Classic Teotihuacan ceramic materials (Late Tlamimilolpa to Late Xolalpan, ca. A.D. 450-750) at a rural site, Santa Maria Maquixco Bajo, partly excavated by personnel from the Teotihuacan Valley Project (William T. Sanders, director). The archaeological distribution of Spondylus calcifer (Carpenter 1857) suggested that a small social group functioned as trade "middlemen" in the importation of Pacific Coast shell to Teotihuacan, and were possibly involved in the subsequent market distribution to artisans at the urban center. Alternative hypotheses are also examined. (36)

Krotzer, Paula H., EXAMPLES OF THE USE BY AN ARCHAEOLOGIST OF HER ETHNOGRAPHIC STUDIES OF THE TECHNOLOGY AND SOCIOLOGY OF MEXICAN VILLAGE POTTERS. It is proposed that the archaeologist working where ceramics are part of the artifact inventory has much to gain from observing potters whose techniques approximate those of the prehistoric culture. Not only will he recognize the marks of tools and techniques of construction and decoration on the sherds, which should make his types more closely reflect the potters' modes, but he will also acquire a fund of knowledge about the residence patterns, economics, and sociology of the potters that will contribute to a more sophisticated interpretation of his total data. (26)

Krowne, C. M., R. V. Sidrys, and H. B. Nicholson, MAYAN/CHRISTIAN DATE CONVERSION COMPUTER PROGRAM. A computer program has been developed for converting the Maya Long Count Calendar to the Christian Calendar (or the reverse) for dates exceeding A.D. 100. This program eliminates the possibility of error in performing a large number of conversions and is much quicker than using correspondence tables. The Modified Thompson 2 Correlation Constant is used. An alternative constant may be employed. (25)

Kus, James S., CHIMU IRRIGATION AT THE QUEBRADA DE OSO SITE. The Quebrada de Oso site is a small (ca. 50 hectares) area of irrigated agriculture associated with the Chicama-Moche Canal, an important inter-valley canal in northern coastal Peru. The site contains several structures, but is most interesting for its near perfect preservation of irrigation features. The remains of agricultural fields in the central portion of the site were studied in detail. Six different furrow design types were identified and analyzed, particularly with regard to such factors as slope, field size, and possible crops. (45)

Ladd, Edmund J., ARCHAEOLOGY IN ARID ENVIRONMENTS: NATIONAL PARK SERVICE ARCHAEOLOGY IN THE 50TH STATE. The Hawaiian utilization of the arid environments now within the National Park Service system is examined, in particular, Haleakala, Maui, and the City of Refuge and Volcano areas of the island of Hawaii. (10)

Lange, Frederick W., SLAVE MORTUARY PRACTICES ON BARBADOS. Excavations were conducted in a pre-Emancipation slave cemetery on the island of Barbados during spring, 1972. Skeletal materials were relatively well preserved and most permitted the identification of sex and approximate age. Mortuary practices regarding modes of interment and complementary grave goods were also determined and together with the physical data could be subjected to more or less standard burial analyses. Historical documentation relevant to this cemetery permitted us to extend our analysis to an assessment of the potentials and limitations of archaeological methodology in cases such as the one described. (18)

Larson, Lewis H., Jr., THE GUALE: ACCULTURATION ON THE GEORGIA COAST DURING THE SIXTEENTH CENTURY. The Guale, a group of Muskogean speaking villages on the Georgia coast occupied the attention of both the Spanish civil authorities and clergy for a period of over 100 yr. During this period the Spanish succeeded in bringing about a series of profound changes in Guale culture. These changes produced yet another group of the cultural type that had become general throughout La Florida in the sixteenth century, the "Spanish Indians." (19)

Laughlin, W. S., A. B. Harper, and S. B. Laughlin, SEA LEVEL, STRATIGRAPHY AND RADIOCARBON DATING OF THE ANANGULA UNIFACIAL INDUSTRY: 8400-7600 B.P. Three forms of evidence independent of each other—sea level, volcanic ash stratigraphy, and radiocarbon dates—show agreement in placing the span of occupation of the Anangula inhabitants from 8400 B.P. to 7600 B.P. Excavations of 1972 show that the occupation is 5 m above an exposed 7 m wave cut terrace which silhouettes the island. This marine terrace indicates that tectonic uplift took place, the minimal amount of the uplift, and the time that it occurred. The low periphery of the site is as old (8435±500) as the higher portion of the site. The more recent post-uplift village occupation is 22 m above sea level. This elevation indicates the minimum elevation required for year round occupation of Anangula. A rising sea level curve based on data inside Nikolski Bay indicates that the inhabitants were forced to leave because of sea level encroachment around 7600 yr ago. The site was preserved by tectonic uplift taking place between 6000 and 5500 yr ago, an event which drained Nikolski Bay and altered the southern end of Umnak Island. (7)

Lees, Susan H., IRRIGATION, ECOLOGICAL FEEDBACK, AND POLITICAL DEVELOPMENT. Archaeological reconstructions of the development of complex, centralized political

structures generally ignore ecological feedback processes arising from concomitant environmental exploitation patterns. The study of hydraulic facility development in relation to political organization is particularly enlightening in this regard. The explanation of cyclical patterning in the growth, expansion, decline, and disintegration of centralized hierarchical political organization in societies dependent upon hydraulic facilities should take environmental feedback into account. This paper will describe and discuss such a pattern as it has occurred in the Valley of Oaxaca, Mexico, and attempt to apply conclusions from this study to apparently similar processes occurring elsewhere in the archaeological and ethnographic record. (1)

Leone, Mark P., MATERIAL CULTURE IN AMERICAN UTOPIAS. Utopias founded under religious aegis usually attempted to express their principles for guiding life in every activity, including the community's technology. Most objects had explicit ideological significance. This is certainly true among nineteenth century Mormons and shakers. Further, objects were often fashioned in such a way that their form and use reinforced the ideology manifested in them. This feedback relationship is usually an opaque one in American culture, but in our utopias it was clearly understood. After these utopias were absorbed into mainline American society, the explicitness of the relationship between their religious ideals and the form of objects disappeared. The specifics of this evolutionary sequence are treated in this paper in an effort to understand the interrelationships between the basic technology of a group and its conscious ideology. (9)

Lewis, Father Clifford M., THE CALUSA. The group covered in this presentation was described by Goggin and Sturtevant as the Calusa, a stratified, non-agricultural society occupying a subarea of the Glades area in southwestern Florida. Their principal areas of occupation were along the west coast of Florida between Charlotte Harbor and Key Marco, with lesser sub-areas to the east, principally that near Lake Okeechobee. The culture is characterized by construction of elaborate mounds and canals, whose features seem to indicate ritual as well as practical significance. Efforts of Jesuit and Franciscan missionaries to establish centers among the Calusa met with failure, but first-hand reports on the culture by the Jesuits and the early accounts of Menendez' attempts to cultivate the group provide many valuable details. (19)

Linares, Olga F., ADAPTIVE RADIATIONS AND POLITICAL GROWTH IN THE TROPICS: A CONTROLLED COMPARISON OF EVOLUTIONARY DIVERGENCE DURING THE FORMATIVE AND CLASSIC PERIODS IN WESTERN PANAMA. Observed differences in subsistence-settlement patterns between the Atlantic sector (Bocas province) and the Pacific sector (Chiriqui province) of western Panama during the Classic period (A.D. 300-900) are attributed to evolutionary divergence in members of one original highland-based population which migrated to either coast during the Formative and possibly before. A controlled archaeological test of long-range micro-environmental influences on the adaptive strategies of 2 migrant populations. (37)

Linares, Olga F., and Payson Sheets, LATE FORMATIVE ADAPTATIONS TO THE WET HIGHLANDS OF WESTERN PANAMA: NEW SETTLEMENT-SUBSISTENCE DATA FROM BARRILES AND ADJACENT AREAS. Systematic survey and excavations in the basins of El Hato and Cerro Punta (Volcan area, Chiriqui) has revealed a dense Late Formative (A.D. 0-300) "Barriles" occupation comprising more than 40 sites located in the high terraces of Rio Chiriqui, at elevations between 1200 and 2000 m. A discussion, in the light of micro-ecological differences, of contrasts in settlement patterns and subsistence techniques between these basins. (37)

Lindsay, Alexander, J., Jr., and R. Gwinn Vivian, ARIZONA CONTRACT ARCHAEOLOGY: A SUCCESS, WHY? Publication of Public Archeology has focused attention on the Arkansas Archeological Survey, a successful model for programs designed for the management of cultural resources. An alternative to this model is the Arizona program for contract archaeology. In Arizona, a collaborative mosaic of institutions work in concert to formulate administrative practices, field strategies, and contemporary and future designs for archaeological resource management. (29)

Litvak-King, Jaime, THE RISE AND FALL OF THE CLASSIC AT XOCHICALCO. The paper examines the processes of formation and dissolution of the Mesoamerican Classic as they affected Xochicalco. Evidence from the site, and its surrounding area, including the whole of the Morelos Valley, is examined and the results are framed within a general hypothesis for Mesoamerica. Xochicalco is looked at from the point of view of changes in its settlement pattern and the whole problem is focused as part of a more general overview dealing with the existence of a general communication network in the area whose changes produced, and were affected by, corresponding modifications in the site. (27)

Lyons, Thomas R., James I. Ebert, and Robert K. Hitchcock, THE USE OF REMOTE SENSING IN THE MAPPING AND ANALYSIS OF A PREHISTORIC IRRIGATION SYSTEM. A prehistoric irrigation system at Kin Bineola near Chaco Canyon in northwestern New Mexico was microtopographically mapped with the use of easily-obtained black-and-white aerial photographs and a Keshl plotter with the intent of determining the effectiveness of photogrammetric procedures in identifying cultural features in an arid region of extremely low relief, in delineating appropriate problems, and in planning subsequent

archaeological research strategy. It is acknowledged that remote sensing is not an end in itself, and that its proper use can only come after the framing of valid questions to be asked of the visual record; with this in mind, the application of aerial remote sensing to several possible archaeological problems is discussed. Aerial and satellite remote sensing techniques are more than mere reconnaissance tools and have analytical and explanatory import to archaeologists and anthropologists. (39)

McCoy, Patrick C., THE HOUSEHOLD UNIT IN THE EASTER ISLAND SETTLEMENT PATTERN. (18)

McCutcheon, Mary, and Morgan J. Tamplin, COMPUTER-GENERATED KEYS FOR CERAMIC AND LITHIC TYPOLOGIES. A program written by R. J. Pankhurst at the Cambridge University Mathematical Laboratory has been used to produce botanical keys. Its success suggests applicability to archaeological typologies—specifically White Mountain Red Ware. The utility of the system exists not so much in establishing new typologies as in making explicit the criteria employed to arrive at (or key out) types. The program creates the most parsimonious mathematically defined key which rejects redundant attributes and weights others according to expected frequencies and significance. It may be a useful tool for anyone concerned with artifact typology. (26)

McHugh, William P., THE TEACHING OF ARCHAEOLOGICAL ANTHROPOLOGY—TEN YEARS LATER. In 1963, 6 papers on teaching archaeological anthropology were published in the volume *The Teaching of Anthropology*. These papers outlined various concepts, themes, course and program designs, and statements on the educational purposes and functions of archaeological training. This paper considers the changes that have taken place in American archaeology in the past 10 yr and offers some ideas concerning what new elements should be included in archaeological training today. (42)

McNett, Charles W., Jr., REGIONAL DATA BANKS FOR COOPERATIVE RESEARCH: THE POTOMAC RIVER EXAMPLE. Program MAPLO, a data storage and retrieval system developed by the Potomac River Archeology Survey, which is composed of archaeologists from the D.C. Consortium of Universities, is described and evaluated. One of the strengths of the system is its ability to map the distribution of artifacts both intra- and inter-site. A number of weaknesses are also discussed, and the program is evaluated in light of practical experience with its use. Suggestions for the improvement of the system, applicable to data banks in general, are made. (3)

McVicker, Donald E., POTS—PAST AND PRESENT. Recently students of material culture have examined modern ceramic production from an archaeologically relevant perspective. However, the applicability of these case studies of pre-industrial technology to the study of the social and ideological correlates of ceramics in complex societies is questionable. To explore the structure of these correlates in an urban environment, the analysis of modern place settings sold throughout the branches of a department store serving diverse sectors of the buying public was undertaken. Preliminary results suggested that certain dimensions of complex social organization were as clearly expressed in the distribution and "consumption" of items of material culture as they were in observed behavior or recorded expectations. It was concluded that, given appropriate methodologies and techniques, statements about selected cultural sub-systems based upon items of material culture can be more efficiently derived and scientifically validated than similar statements based solely upon traditional ethnological data. (9)

Mack, Joanne M., IMPLICATIONS OF "SHIELD FIGURES" FROM THE BIG HORN MOUNTAINS OF WYOMING. While recording and analyzing pictographs from 4 sites in the Big Horn Mountains of Wyoming, some difficulties were encountered with "shield figures." It is considered more likely that the present known distribution of "shield figures" is better explained by "the theory of limited possibilities." It is also concluded that attributes (other than a circular design element), which make up the shield figure, should be analyzed and compared, rather than the whole figure. (26)

Mackey, Carol J., DIFFUSION AND INVASION IN THE MOCHE VALLEY, PERU. A critical examination of archaeological remains from the Moche Valley does not support current models of the role of diffusion and invasion on the Peruvian north coast. This paper generates an alternative model for the role of these factors during the later prehistoric occupation. (16)

MacNeish, Richard S., THE AYACUCHO ARCHAEOLOGICAL SEQUENCE. In Ayacucho during the last 4 yr, a 22,000 yr sequence of archaeological remains has been uncovered. This sequence is based upon the excavation of 20 stratified sites and is confirmed by 46 Carbon-14 dates. Studies of pollen, geomorphology, and soils correlate the archaeological sequence with various periods of climatic change. There appears to be an early period of glaciation with a maxima at about 16,000 yr ago, a further glacial period with a maxima about 14,000 yr ago ending about 12,000 yr ago. Since that time, there has been a gradual drying up of the valley although it was wetter and forest growth more extensive from 12,000 yr ago to about 5000 yr ago. Then there may be a drying period from 5000 to 3000 yr ago with increasing wetness from 3000 to about 1000 yr ago and then a final period of desiccation. The archaeological sequence may be divided into 14 archaeological periods,

throughout which there has been a stimulating set of interactions with other developments in the highlands and on the coast. (32)

Maddox, Darryl, TESTING ECONOMIC HYPOTHESES IN ARCHAEOLOGY. (8)

Madsen, David B., PLUVIAL-POST PLUVIAL VEGETATION CHANGES IN THE SOUTHEASTERN GREAT BASIN. A sequence of vegetational and climatic changes is provided for Meadow Valley Wash, southeastern Nevada through interpretation of fossil pollen, fossil plant macrofossils, alluvial stratigraphy, and a chronology established by 31 radiocarbon dates. Plant macrofossils from 12 dated woodrat middens indicate a transition from a Pluvial plant community dominated by bristlecone pine-limber pine-white fir, to a white fir-juniper-pinyon pine dominated community, to a juniper-oak-ash dominated community similar to modern vegetation. Pollen from stratified cultural and non-cultural sites shows a distinct vegetational change between ca. 5000-3000 B.P., possibly indicating dryer and/or warmer conditions. An increase of sagebrush and juniper pollen occurs thereafter, with pine pollen being introduced and gradually becoming more important after ca. 3000 B.P. A Post Pluvial sequence of cyclic alluvial erosion and deposition has occurred in the wash, with 5 of these cycles having occurred in the last 2000 yr. (12)

Magalis, Joanne E., MARAJOARA INCISED CERAMICS AND THE POLYCHROME HORIZON. A close relationship between the Marajoara phase of the mouth of the Amazon and the Napo and Caimito phases of the upper Amazon has been recognized. The motifs, vessel forms, and decorative techniques of Marajoara incised ceramics will be compared with the motifs, vessel forms, and decorative techniques of Napo and Caimito. These comparisons and their implications for South American Tropical Forest culture history will be examined in the light of a new seriation of the Marajoara phase. (30)

Marcus, Joyce P., REGIONAL DRESS PATTERNS OF CLASSIC MAYA WOMEN. The iconographic study of Maya women portrayed on Classic period monuments reveals distinct regional dress patterns. Elite women in the upper Usumacinta drainage were probably members of a common lineage, linguistic group, and all wear embroidered textiles. High-status women in the Peten were members of a different linguistic group and wear tubular-beaded "jade" skirts. The pattern recovered from these monuments can be explained by linguistic, political, economic, and ecological variables. (22)

Marquardt, William H., A STATISTICAL ANALYSIS OF HUMAN PALEOFECAL SPECIMENS. Data from human paleofecal specimens collected in Salts and Mammoth Caves, Mammoth Cave National Park, have been analyzed with a variety of statistical techniques. Culture historical implications are discussed. (33)

Martin, Paul S., AN APPROACH TO TRAINING ARCHAEOLOGISTS AS ANTHROPOLOGISTS: AN EDUCATIONAL PHILOSOPHY. The training program for students at Vernon, Arizona, has undergone many changes since its inception 8 yr ago. At present, our purpose is to increase the opportunities for undergraduates to obtain experience in investigating a problem that is designed by and for each student as an individual. We have found that an open approach to learning about sciences creates opportunities for research participation that are not usually found in normal curricular patterns. By placing responsibility for learning on the shoulders of able students, the problem-oriented approach is a powerful motivator. Accordingly, learning proceeds along experimental, broadly based, and multi-dimensional lines. Theoretical rigor is introduced and accompanies precise data-gathering by competent "dirt" archaeologists. Innovative aspects of the field school include theoretical orientation, an atmosphere of individual intellectual freedom, and an emphasis upon inter-disciplinary and differing approaches within anthropology. (42)

Marwitt, John P., Robert V. Morey, and James A. Zeidler, RECONNAISSANCE OF THE UPPER ARIARI RIVER REGION DEPARTMENT OF THE META, EASTERN COLOMBIA. An archaeological survey of the upper Ariari River has recorded a total of 19 sites, the first ever reported for the Llanos Orientales of Colombia, an area of more than 150,000 sq mi. Sites are up to 12 acres in areal extent, and in some cases, more than 3 ft in depth. Large sites are confined to the Ariari floodplain. The unexpected size and depth of the sites suggests long occupations by large, sedentary societies. This would conflict with traditional interpretations of lowland South American prehistory which argue that except in the floodplains of major rivers like the Amazon and Orinoco, social groups were small, scattered and mobile. (45)

Matheny, Ray T., THE MOATED "FORTRESS" OF EDZNA, CAMPECHE, MEXICO. A water moat system linked to a 12 km long canal is currently under investigation. The "fortress" is about the same size as the site of Becan but contains only a few constructions of the Late Preclassic and Early Classic periods. No significant Late Classic period occupation exists with the main canal or moated structure. Water remains in the canal until March at the present time and is a source of fish and other aquatic life throughout the winter. The "fortress" may or may not have functioned in Late Preclassic period military operations. (38A)

Mauer, Michael D., and John P. Mollay, A COMPARATIVE STUDY OF FOUR SOUTHWESTERN POLYCHROMES. A stylistic analysis of 4 regionally separate but

temporally overlapping polychrome ceramic wares is made. This corpus includes Chihuahua Polychromes, Babicomari Polychrome (southeastern Arizona), Kinishba Polychrome (east-central Arizona), and Sikyatki Polychrome (Proto-historic Hopi). The spatial and temporal relationships of these ceramics are discussed, as are their functional and cultural implications. (26)

Mayer-Oakes, William J., AN OBSIDIAN SOURCE IN HIGHLAND ECUADOR. Recent field investigations have located a major obsidian source at a high elevation in the eastern Andes. Current neutron activation studies of obsidian from archaeological sites in this vicinity as well as from the source should help resolve the current conflict between dates based on typological considerations and dates based on Carbon-14 or hydration techniques. (45)

Mehringer, Peter, C. N. Warren, and Austin Long, DUNE CHRONOLOGY, OCCUPATION, AND RESOURCES, AMARGOSA DESERT, NEVADA. A 5300 yr radiocarbon dune chronology has been established for Ash Meadows, Amargosa Desert, Nevada, by the dating of interbedded marsh deposits. Periods of high local water tables and peat deposition are dated at 5300-4700 B.P., 400-3500 B.P., and about 350 B.P. A significant period of reduction to low relief, stability, and soil formation in dunes is dated between 3000 B.P. and 2000 B.P. Important dune resources, especially mesquite (*Prosopis juliflora*), are controlled by the degree of dune stabilization; semi-stabilized dunes appear to be the most productive. The archaeological chronology can be related to dune history and it is likely that aboriginal utilization of the Amargosa Desert was influenced by this history. (12)

Matson, Richard G., and William D. Lipe, REGIONAL SAMPLING: A CASE STUDY. The Cedar Mesa Project is an attempt to characterize the archaeology and environment of an approximately 300 sq mi area of southeastern Utah on the basis of a sampling design. Randomly selected watershed areas provide primary sampling units or clusters. Each cluster is randomly sampled within specified strata by means of 400 m square quadrats. The rationale for selecting this type of methodology will be stated. The sampling design will be critically evaluated in light of the first season's work. Results of testing the main hypotheses by non-parametric analysis of variance techniques will be given as well as confidence intervals for the variables under investigation. Survey results will also be compared with those generated by sampling simulation in a part of Cedar Mesa intensively surveyed prior to the start of the present project. Finally, some general comments on problems of multi-purpose archaeological regional sampling, and of selection of sites for excavation, will be offered. (28)

Mauer, Michael D., STRUCTURAL ANALYSIS OF HIGH STATUS BURIALS FROM THE PREHISTORIC SOUTHWEST. A structural analysis of 2 "high status" burials (B. 140 from Grasshopper, and B. 16 from the Ridge Ruin) is presented. High rank is inferred for these individuals, which suggests that PIII and PIV societies were not egalitarian. Possible symbolic continuity with Mesoamerican and ethnographically-known Pueblo societies is explored. Comparisons with relevant Mesoamerican data are made. (18)

Meighan, Clement, RESEARCH VERSUS PEDAGOGY IN ARCHAEOLOGICAL FIELDWORK. The excavation of archaeological sites imposes a research obligation on the excavator. Digging sites for student training creates a teaching obligation for the excavator. Teaching and research obligations are not necessarily incompatible, but the procedures of excavation must balance the 2 kinds of obligation, and this often requires handling a "teaching" excavation in a somewhat different way than a purely "research" excavation. Some of the practical and intellectual problems in this area of concern are discussed. (42)

Metcalf, Michael D., and Elizabeth Ann Morris, EXCAVATIONS AT DIPPER GAP: A MCKEAN COMPLEX CAMPSITE, LOGAN CO., COLORADO. The 1972 Colorado State University Archaeological Field School excavated a McKean phase site on top of a butte in the south facing escarpment system flanking the high plains in Logan County, Colorado. Stratified fill in a rock shelter and on the butte indicated an intensive early Middle Period occupation in association with bison bones, overlain by smaller quantities of later remains. Cultural affiliations are strongest with an increasingly well known Plains Archaic complex which includes the McKean type site in northwestern Wyoming, Signal Butte I in western Nebraska, the Kobald site in southern Montana, and other bison kill sites in the Powder River Basin. (44)

Messer, Ellen, SOWN AND UNSOWN ASPECTS OF PRODUCTIVITY IN AGRICULTURAL SYSTEMS IN THE VALLEY OF OAXACA, MEXICO. Agricultural systems of Zapotec populations in the Valley of Oaxaca, Mexico, are looked at from the point of view of the entire cultivation system's contribution to the diet. The field systems studied are briefly described. Then, 6 edible non-cultivated "weed" species are examined as integral parts of the field systems. Cultural practices and attitudes which affect the growth and utilization of these species are considered both from the subjective viewpoint of the Zapotec population and the objective viewpoint of the botanist. Cultivation practices are shown to contribute to an agricultural environment which supports "wild" plant populations of nutritional value to the human populations, in addition to the sown cultigens. (1)

Milanich, Jerald T., **THE WESTERN TIMUCUA: PATTERNS OF ACCULTURATION AND CHANGE.** The western Timucuan tribes were the Utina, Yustega, Potano, and Ocale. The Potano and Ocale shared the material culture of the Alachua archaeological tradition, while the Yustega and Utina (and other Florida Indian tribes) shared the Leon-Jefferson complex. To date the most intensive research has been on the Potano. Excavation of several seventeenth century villages has provided information on forms and rate of Potano acculturation. By interpreting this evidence in the context of known ethnohistorical descriptions, general statements concerning mission Timucuan culture change can be made. The ability of archaeological methods to detect short term culture change is also examined. (19)

Miller, Arthur G., **EXCAVATIONS AT TANCAH, QUINTANA ROO, MEXICO.** For the 1972-73 field season of the Quintana Roo Mural Project sponsored by the Center for Pre-Columbian Studies, Yale University, and The National Geographic Society, a series of test excavations are projected for the immediate area around Structure 12 at the Post-Classic Maya site of Tanchah on the east coast of Yucatan. The primary purpose of the excavation is to gather ceramic and artifactual data for the dating of the mural associated with Tanchah Structure 12. The results of these excavations are reported; and architectural, mural, and ceramic data from Tanchah and Tulum are compared so that their implications for the archaeology of the east coast of Yucatan can be evaluated. (43)

Molloy, John P., Hugh G. Ball, and William B. Kessel, **THE CODEX NUTTALL: UNIVERSAL EPIC OR NARROW NATIONALISM.** Traditionally the Nuttall codex has been considered a historical Mixtec document. Recently, however, Chadwick (1971) has found internal evidence suggesting that the Nuttall is a multi-lingual composition aimed at a broadly based Mesoamerican audience. It is proposed here that the Nuttall is a historical and literary commentary exhibiting both universal (pan-Mesoamerican) and specific (Mixtec) symbolic content. A method is proposed and tested which is designed, through the utilization of structural analytical tools, to retrieve symbol categories common to literate members of the Mesoamerican megaculture as a whole while factoring out possible nationalistic biases of the hypothesized Mixtec composers. (22)

Monseth-Irwin, Ann, Roald Fryxell, Carl E. Gustafson, Henry T. Irwin, and Guy Muto, **INTERDISCIPLINARY INVESTIGATIONS AT THE LIND COULEE SITE, GRANT COUNTY, WASHINGTON.** First investigated in 1950-52 by Daugherty (1956), the Lind Coulee Paleo-Indian site recently has been endangered by irrigation overflow. Excavation was renewed in 1972 with support of the National Park Service and the Bureau of Reclamation. Initial occupation followed draining of a proglacial lake, during a cool moist climatic regime. Later occupation coincided with abruptly decreasing precipitation. New data pertains to fauna, microfauna, geomorphology, palynology, and lithic technology, along with other archaeological aspects. Mathematical analysis by computer graphics has aided this work. (7)

Montet-White, Anta, and Roger Grosser, **APPLICATION OF FOURIER SERIES TO THE TIME-TREND ANALYSIS OF ARCHAEOLOGICAL DATA.** Most archaeological phenomena can be expressed in the form of measurements; the distribution of these measurements through time is assumed to approximate that of a normal curve. In many cases, however, distributions do not fit the normal curve model but form series of more or less regular oscillations. Fourier series is a technique directly applicable to the study of oscillatory phenomena; it is used here in an attempt to recognize significant patterns of distribution for non-normally distributed data. (39)

Moore, Kenneth, **NATURAL ENVIRONMENTS AND SOCIAL BOUNDARIES IN HAWAII.** Socio-political boundaries of the Hawaiian cultural system defined in the post-contact period are compared with natural boundaries based on topography, soil types, and vegetation. (10)

Moratto, Michael J., **ARCHAEOLOGICAL CAPS AND POLITICAL GOWNS: THE RENAISSANCE OF PUBLIC ARCHAEOLOGY IN CALIFORNIA.** American archaeology presently faces multiple crises: (1) vast stores of field data are annually destroyed by accelerating land developments; (2) recent proliferation of excavations by high schools, 2 year colleges, and avocational groups has resulted in intensified data collection without adequate provision for analysis, interpretation, or publication of findings; (3) the public sector manifests its growing interest in the country's cultural heritage by demanding more popular and less technical archaeological reports; and (4) traditional university archaeology programs are simply not prepared in terms of funding or facilities to coordinate poly-institutional multi-disciplinary research on a regional basis. In California, these related problems are being met on 2 fronts through the establishment of regional "cooperatives" and the creation of a "State Heritage Agency." The nature and status of these programs will be discussed in this paper. (31)

Morrell, L. Ross, and B. Calvin Jones, **THE APALACHEE.** Archaeological research over the past 20 years have both verified and disproven documentary accounts of the Apalachee. The archaeological evidence for house types, community size, burial practices, artifact types, and subsistence will be presented and compared with documentary descriptions. Specific artifact examples exhibiting Spanish influence on native crafts will be shown and, where possible, their "pure" native counterparts compared. (19)

Morris, Craig, **THE DEVELOPMENT OF ANDEAN URBAN PATTERNS: A PERSPECTIVE FROM THE LATE HORIZON.** The combination of documentary information and increasingly rich archaeological evidence in certain areas is enabling us to outline a picture of urbanism for the Inca period. The purpose of the paper will be to summarize the major characteristics of that emerging outline, and to use them to formulate hypotheses regarding earlier stages in the development of urban, state societies in the Andes. (32)

Morris, Craig, **SAMPLING PROBLEMS IN THE EXCAVATION OF AN URBAN SITE: THE CASE AT HUANUCO PAMPA.** The paper will consider the design of an excavation strategy for an Inca city within the more general context of attempts to deal with the extremely large and variable populations facing the urban archaeologist. The use of surface architectural remains in sample stratification will receive special emphasis, and some of the successes and shortcomings of the strategies we have employed at Huanuco Pampa will be discussed on the basis of preliminary results. (28)

Morrison, Roger B., **THE HOLOCENE GEOLOGIC-CLIMATIC RECORDS IN THE GREAT BASIN AND IMPLICATIONS FOR THE FUTURE.** Effects of climatic changes during the last 11,000-10,000 yr (the Holocene epoch) were intensified in the Great Basin because of the severe continentality of this region. These effects are manifested by considerable fluctuations in levels of "Pluvial lakes," in details of geologic-sedimentary sequences of various kinds, and in archaeological records of the human population. Nevertheless, the Holocene changes were trivial compared to those of the Pleistocene. Evidence on several fronts suggest that the warm interglacial climate of the Holocene either has already ended or will end within several centuries and consequently with the ensuing glacial interval, mankind soon will be subjected to climatic stress far more severe than any since Indo-European civilization began ca. 6000 yr ago. (4)

Morse, Dan F., **THE CAHOKIA MICROLITH INDUSTRY.** Paleo-Indian, Jacketown, and Hopewell blade and core industries in the eastern United States have been widely known for 2 decades or more, although normally only Hopewell cores and blades are discussed in the literature. Other core and blade assemblages are now becoming known, such as the Cahokia microlith industry. Centered at the Cahokia site, located near St. Louis, characteristic cores, blades, and tools have been recognized in Arkansas and Florida, possibly associated with a frontier Mississippi culture. Apparent techniques of manufacture and hafting and probable uses of tools are described. Manufacture may have involved the use of a vise, a grooved potsherd. Hafting could have been accomplished by inserting a microlith into the end of a freshly cut cane. Microliths seem to have functioned mainly as graters and drills. (38)

Moseley, E. M., **LABOR ORGANIZATION IN LARGE SCALE CONSTRUCTION PROJECTS.** An examination of large scale building projects within the Moche Valley implies that prehistoric, corporate labor forces were composed of discrete teams of workmen each responsible for a specific task or distinct segment of construction. The hypothesis is advanced that different work teams were drawn from distinct social units obliged to fulfill a labor tax. (16)

Moseley, M. Edward, **THE DEVELOPMENT OF URBANISM IN THE MOCHE VALLEY, PERU.** Evidence collected over 4 years of survey and excavation in the Moche Valley on the north coast of Peru conclusively demonstrates that large scale urbanism was not introduced into the valley during the Middle Horizon via the process of foreign invasion. Earlier diffusionist models positing the foreign origin of urban residence are reviewed and shown to be pseudo-explanatory propositions based on inadequate survey and incorrect dating of large prehistoric settlements. Whether the Moche Valley the phenomenon of urban settlement represents an internally consistent development firmly established by the beginning of the Early Intermediate Period. (32)

Mountjoy, Joseph B., **THE COLLAPSE OF THE CLASSIC AT CHOLULA, AS SEEN FROM CERRO ZAPOTECAS.** During 2 summers (1969 and 1970), study of prehispanic land use on the eastern edge of Cholula revealed drainage of a fertile lowland area during the Preclassic-Classical transition, plus evidence that the area was abandoned during the terminal Classic and Early Postclassic. In 1971, attention was shifted to the nearest highland zone, Cerro Zapotecas, to study changes in a different ecological setting. Surface sampling and excavation yielded extensive representation of Late Classic-Early Postclassic transitional material. The nature of this occupation and what it may reveal about factors involved in the collapse of the Classic at Cholula are discussed. (27)

Mueller, James W., **ARCHAEOLOGICAL RESEARCH AS CLUSTER SAMPLING.** The thesis of this essay is that certain kinds of archaeological research conform to the definition and process of cluster sampling. Cluster sampling is defined in terms of basic concepts—element, sampling unit, and population—and is illustrated archaeologically. The differences between cluster sampling and other methods—simple random, systematic, and stratified sampling—are discussed. The implications of this thesis in hypothesis testing and statistical inference are grave; significance levels based on cluster sampling are different from those based on the other kinds of sampling. (28)

Muller, Jon, **LATE MISSISSIPPIAN SETTLEMENT IN THE KINCAID AREA.** Excavations and intensive survey in the area around the Kincaid site in Pope and Massac Counties,

Illinois, tend to support some, but not all, of the traditional models of Mississippian settlement in this area. Former estimates of population appear to have been too high, but settlement is organized in a more or less hierarchical fashion. (23)

Muto, Guy, **ATTRIBUTES OF TECHNOLOGY VERSUS ARTIFACTS OF CULTURE**. Recently we have come to better understand the mechanical principles of flintworking, and through the work of Faulkner, Speth, Muller-Beck can list those attributes of technology which are mechanically constant as related to technique, i.e., the formation of "lips, hackles, wallner lines, undulations, gullwings, radial striations," and errata: yielding "information about platform orientation, fracture direction, stress intensity, stress direction and perhaps others" (E 1972). Formal typology has long been a standard means of investigation and recently modified by the use of metric analysis and the super toy "The Machine." However, there seems some confusion about what to measure and of what significance it is once measured. The suggestion presented here is that technique and culture equals technology, and that metric attributes must be wed to qualitative features to provide a tool for the archaeologist. (2)

Muto, Guy R., **LEVALLOIS BLADES IN THE OLD AND NEW WORLD**. The recent recognition of a Levallois-like technology in the New World has led to the discovery of diagnostic blade types not conforming to the classic definition of a blade and not derived from a polyhedral core. Blades have long been known from the Pacific Northwest but have not been associated with polyhedral cores in the older assemblages. The technology which lies behind this phenomenon is explored. (38)

Neely, James A., and Michael J. O'Brien, **IRRIGATION AND SETTLEMENT NUCLEATION AT MONTE ALBAN: A TEST OF MODELS**. Fieldwork during the summers of 1971 and 1972 has determined the presence of water control and irrigation systems at the site of Monte Alban, Oaxaca, Mexico. The findings are presented as a practical test of irrigation based theoretical models proposed to explain the development and maintenance of prehistoric settlement nucleation. (13)

O'Brien, Patricia J., **A NEW SYNTHESIS OF STEED-KISKER (WESTERN MIDDLE MISSISSIPPIAN) CULTURE**. For the past 5 yr new research has resulted in sufficient data with which to radically revise the accepted views of the nature, settlement pattern and social structure of these people. The old view saw this system as one of small agricultural villages, using the bison resources of the plains and having an unstratified and undifferentiated social order. New hypotheses concerning these notions as well as demographic data are presented here which suggest a settlement pattern of individual households (with 2 or 3 structures per site) with some labor specialization. The population seems to be integrated via a common mortuary area and ritual with probably only 6 to 8 households represented per cemetery. The implications of such a cultural pattern are examined in relationship with empirical data to test the idea that Steed-Kisker culture originates from the Cahokia area and evolves or is transformed into Nebraska culture. (44)

O'Connell, James F., and Robert Bettinger, **LITHIC ANALYSIS IN SETTLEMENT STUDIES: AN EXAMPLE FROM THE NORTHERN GREAT BASIN**. Prehistoric sites in Surprise Valley, northeastern California, have been divided into several functional categories on the basis of locational criteria and the formal character of artifact assemblages. Reconstruction of activities at each site permits predictive statements about certain characteristics of associated chipped stone tools, including edge angle values and edge damage, and about the quantitative and qualitative aspects of variation among these characteristics at different kinds of sites. Confirmation of these predictions through lithic analysis supports the validity of the settlement model. The general implications of the research for the reconstruction of prehistoric settlement and subsistence patterns are discussed. (34)

Olsen, Stanley J., **INTRODUCTION OF DOMESTIC ANIMALS INTO THE SOUTHWEST**. Most archaeologists agree that the only domestic animals known to the Indians of the southwestern United States were the dog and turkey, prior to 1540. Between 1540 and the Pueblo Revolt of 1680, stock raising became a part of the culture of a few southwestern Indians. Some archaeological sites, particularly at Awatovi, Arizona, have yielded domestic animal bones of a quantity sufficient to compare with known breeds today. The animals at Awatovi as well as those of other points of introduction are discussed and illustrated. (18)

Olsen, Stanley J., **ZOOARCHAEOLOGY IN THE ANTHROPOLOGY CURRICULUM**. The value of the study of faunal remains as an aid toward interpreting an archaeological site is rarely questioned but is rather accepted as are many other interdisciplinary studies (dendrochronology, pollen analysis, soil studies, etc.). How to best implement a course of studies so as to be of the most importance to archaeologists and yet not duplicate programs already offered by zoology or biology departments poses a few problems. The acquisition and housing of required research materials also must be considered. The use of both laboratory and field methods of instruction must be correlated. These and related subjects are discussed, giving examples of programs already in operation and how they have fared. (18)

Olson, Alan P., **AN EXAMINATION OF SOME FRONT RANGE ARCHAIC COMPLEXES IN COLORADO**. Projectile points from recently excavated stratified sites from the Denver

Basin north have been analyzed by multivariate and cluster analysis of attributes. The technique shows promise for the separation of various Archaic types from each other and from the later Woodland period. Earlier postulates of the Archaic sequence in the region may be in need of additions or revisions in view of these data. (44)

Ossa, Paul P., **QUIRIHUAC SHELTER: DATING THE PAIJAN LITHIC COMPLEX IN NORTH COASTAL PERU**. Excavations at Quirihuac Shelter and the La Cumbre site, Moche Valley, Peru, have located and further defined the Pajian lithic complex. The dating of this complex is discussed from the view of radiocarbon age determinations at both sites and geological data at La Cumbre. From this an attempt is made to relate the Pajian complex to other early lithic complexes in Andean South America both chronologically and stylistically. (45)

Paradis, Louise Iseut, **ECOLOGICAL AND CULTURAL MARGINALITY IN THE TIERRA CALIENTE OF GUERRERO**. The analysis of the archaeological and ethnohistorical records and of the ecological and modern data led to the construction of a model to account for the cultural adjustments of the Tierra Caliente people to their geographically marginal position in Mesoamerica. A pattern of constant movements of goods and people in and out of the middle Balsas River Basin has been—in the past as well as today—the most successful mechanism to regulate the ecological situation and to maintain contact with the rest of Mesoamerica. The nature of exterior influences (Olmec, Tarascan) is analyzed in this context. (36)

Parsons, Jeffrey R., **THE RISE AND DECLINE OF CLASSIC TEOTIHUACAN: SOME IMPLICATIONS OF CHANGING REGIONAL SETTLEMENT PATTERNS IN THE VALLEY OF MEXICO**. The delineation of regional settlement patterns between late Formative and early Postclassic times (ca. 300 B.C.—A.D. 900) in the eastern and southern Valley of Mexico indicates some marked changes in population distribution at the junctures corresponding to the development and demise of the Teotihuacan state. This demographic and distributional perspective suggests that there are at least 3 radically different settlement systems which succeeded each other in time in this area: a later Formative, a Classic, and an Early Postclassic. This paper attempts to offer a preliminary description of these 3 systems. (27)

Paulsen, Allison C., **SIMILIARY SERIATION AND THE TYPE-VARIETY CONCEPT: AN EMPIRICAL COMPARISON OF TWO METHODS OF CERAMIC ANALYSIS**. A system of ceramic analysis by similiary seriation has been widely used in Andean archaeology, while a type-variety system has been advanced and largely accepted as an analytical method for Mayan and other Mesoamerican pottery. Two recent and independent studies of the Guangala complex of the south coast of Ecuador have been made, one employing the type-variety method, the other the similiary, thus permitting valid comparisons between the principles, procedures, and results, and the weaknesses and strengths of the 2 somewhat differing methods. (26)

Payen, Louis A., **CREVIS CREEK: NEW LIGHT ON THE FARMINGTON COMPLEX**. Chert cores and bifaces referable to the Farmington complex have been found in situ in cemented gravels exposed along Crevis Creek in central California. Analysis of the geology, landforms, and soils in the Crevis Creek valley established a series of fill terraces reflecting cycles of aggradation and degradation thought to be linked to Pleistocene climatic shifts. Tentative correlations are made with recently available studies of Quaternary landscape evolution and stratigraphy for adjoining river valleys. Stratigraphic position of the artifact bearing beds at both Crevis and Farmington suggest similar deposition histories and may relate to Wisconsin glacio-eustatic events. Temporal and archaeological implications are discussed. (15)

Phagan, Carl J., **LITHIC DEBITAGE ANALYSIS, THE AYACUCHO VALLEY, PERU**. During 1971 and 1972, a computer-assisted attribute analysis system was designed to reveal patterns in the specific technological processes of the manufacture of chipped stone implement assemblages. The analysis system was applied to a sample of the materials from the Ayacucho Valley, Peru. Emphasis was placed on the analysis of flakes and debitage in defining technological complexes and their variability through the time period from 8000 B.C. to 2000 B.C. Both the analytic techniques and the derived information suggest that a simplified version of the system may be useful in establishing technological "profiles" that can be compared through time and space for their potential cultural significance. (2)

Pires-Ferreira, Jane Wheeler, **EXCHANGE SYSTEMS IN FORMATIVE MESOAMERICA**. (8)

Pitzer, Jean, **A MICROLITHIC INDUSTRY FROM THE CHANNEL ISLANDS, CALIFORNIA**. The author, in collaboration with T. R. Hester and R. F. Heizer, has been analyzing over 5000 lithic specimens from Santa Cruz and Santa Rosa Islands, California. The collection includes microcores (several types), microblades, drills made on microblades, and burins; the greatest proportion of these materials are microblades ranging from 17 mm to 48 mm in length. The probable methods of detaching the microblades are described. The wear patterns on the drills and burins are discussed and inferences are made as to their

probable uses. The bulk of the collection dates from within the last 1000 yr and occurred in mortuary contexts. (38)

Plog, Fred, MODELS OF ECONOMIC ORGANIZATION AND EXCHANGE. This paper describes theoretical and substantive models of economic organization and exchange appropriate to the interpretation of pattern distributions of non-local raw materials and finished products. The theoretical import of alternative models as well as their explanatory power is considered. Research strategies for evaluating the merits of alternative models are discussed. (21)

Potter, David F., and Joseph W. Ball, PRECLASSIC ARCHITECTURE AT BECAN, CAMPECHE, MEXICO. Excavations at the prehispanic Maya site of Becan during the years 1969-1971 reveal evidence of habitation starting in Late Preclassic times. Two major structures, and fragments of others, are known which date from this period contemporaneous with, or possibly earlier than, the construction of E-VIIISub at Uaxactun. Some of this activity is probably immediately precedent to the construction of the unusual Becan defensive system. (13)

Pratt, Peter P., A NEW TECHNIQUE FOR INTRA-SITE MAPPING. A custom-made telescoping tetrapod with adjustable unipod camera mount provides settings which can eliminate photographic parallax and quickly answer many intra-site mapping problems. A facile photographic laboratory follow-through obviates camera-to-subject measurement differences as they have been experienced in the field and provides an infinite range to overall map scale. (39)

Proulx, Donald A., THE DEVELOPMENT OF URBANISM IN THE NEPENA VALLEY, PERU. Evidence obtained from an archaeological survey of the Nepena Valley on the north coast of Peru suggests that large scale urbanism was introduced into the valley during the Middle Horizon. This paper will explore the development of urbanism in the Nepena Valley and relate it to general trends on the north coast of Peru. (32)

Puleston, Dennis E., THE MANIPULATION OF ENVIRONMENTAL VARIABLES BY HUMAN POPULATIONS AND SIGNIFICANT THRESHOLDS. In contrast to the highlands of Mesoamerica it has often been stated that the tropical forest environment of the Maya lowlands is essentially homogenous. This now appears to be an oversimplification of the case. New evidence indicates that the resources of the sub-tropical forests of this region were manipulated in a variety of dramatically distinct ways. This appears to have been in response to variability in a number of specific environmental factors. Some of the food production sub-systems resulting from this response include slash-and-burn agriculture, river levee cultivation, kitchen gardens, and the cultivation of swamps by the construction of ridged fields. Within each of these sub-systems there are functional relationships between productivity, population density, demography, settlement patterns, and some organizational factors such as social and religious hierarchies, architectural achievement, etc. A model of some of these relationships is presented in an attempt to discover significant thresholds. (1)

Puleston, Olga Stavrakis, CULTURAL VARIABILITY AS AN ADAPTIVE FACTOR IN THE LOWLAND MAYA AREA. It is possible that variability even within small communities is adaptive, providing alternatives for situations of environmental change and thus helping maintain ecological stability. Thus, populations with a greater number of subsistence alternatives in their behavioral repertoire may have greater survival potential than populations with fewer alternatives. Upon examination of the food production techniques and associated social institutions in the Peten, Guatemala, it was noted that (1) there are a wide variety of food-producing techniques, (2) there is a variety of social institutions to accommodate these techniques, and (3) there are a number of uncommon or aberrant practices which are "preserved" by a few individuals but may be utilized by a larger portion of the populations in situations of environmental change. In light of these data and examples drawn from the literature, the effect of variability upon the stability of the ecosystem and the survival potential of the population is examined. (1)

Purdy, Barbara A., THE ARROWHEAD FACTORY SITE (MR 122), MARION COUNTY, FLORIDA: REPORT OF INVESTIGATIONS. Outcrops of high quality chert throughout north-central Florida were exploited by prehistoric peoples to fashion chipped stone tools. The Arrowhead Factory site (Mr 122), Marion County, Florida, was intensively and extensively utilized. In 1970, an acre of this site was bulldozed by amateurs to a depth of 6 in from which approximately 10,000 stone tools were recovered, and loaned to me for study. In order to collect a representative sample of the chipping debris, discarded cores, and crude implements which were of no interest to the amateur collectors, a backhoe trench 5 ft wide and 160 ft long was dug. In addition to the amateurs' collections, 65,000 stone remains from this trench have been analyzed. A study of this kind contributes to our knowledge of lithic techniques and to a greater understanding of the types of activities (other than stone tool production) which took place at workshop sites. (2)

Quirarte, Jacinto, IZAPAN AND MAYAN TRAITS IN TEOTIHUACAN III POTTERY. Present research demonstrates that the Xolalpan vessels found by Linne (1934) and used by Vaillant (1938) to characterize Teotihuacan III pottery, are actually non-Teotihuacan in style. The iconographic programs and the use of a vertical rather than horizontal format

clearly point to Chiapas-Guatemala highland sources. A study of these vessels and other Teotihuacan mould made pottery fragments with Maya figural and narrative programs (reproduced by Linne 1934 and Sejourne 1963) will further elucidate the role played by Izapan and Mayan artists in the development of Teotihuacan art. (5)

Rathje, William L., and Frederick Gorman, THE GARBAGE PROJECT: OSCAR AS ARCHAEOLOGIST. Archaeology can be viewed as a series of conceptual schemes and techniques for studying the relationship between human behavior and material culture, regardless of temporal and spatial coordinates. The Garbage Project was developed to demonstrate the potential of modern material culture studies for describing and explaining contemporary human behavior. The general goal of the project is to use household garbage and census and other survey data to construct a systems model of the dynamics of resource distribution and consumption within a contemporary urban environment. This paper will describe the specific goals, data retrieval strategy, and tentative results of the project. (9)

Ratray, Evelyn C., CERAMIC EVIDENCE ON THE COLLAPSE OF THE CLASSIC AT TEOTIHUACAN. Recently, 25 small-scale, extremely detailed excavations were carried out by archaeologists of the Teotihuacan Mapping Project. The majority show strong Metepec (Teotihuacan IV) occupation occasionally overlain by deposits of the subsequent peoples that occupied the site. Data from excavations and surface survey have modified the picture of a drastic reduction in population during Metepec times and clarified the relationships between Metepec and the immediately succeeding phase. The revised ceramic chronology provides a more solid foundation for understanding the processes involved, in the decline of Teotihuacan. (27)

Raymond, J. Scott, SOME SPECULATIONS ON THE ECONOMIC IMPORTANCE OF THE UPPER MONTANA OF PERU TO PREHISTORIC ANDEAN CIVILIZATIONS. The importance of the forested eastern slopes and valleys of the Andes to the central Andean civilizations has been repeatedly deemphasized by archaeologists and anthropologists. Some have argued that the rugged terrain and dense vegetation of the ceja prevented the highland peoples from conquering, colonizing, or otherwise exploiting this vast region to the east. Archaeological and historical data from the montana and sierra of the Department of Ayacucho are used to support a theory that there was repeated colonization of selected areas of the montana during the later prehistoric and historic periods of Peruvian prehistory. The Middle Horizon is suggested as the possible time for the onset of such colonizations. (30)

Read, Dwight W., REGIONAL SAMPLING. This paper will discuss some of the theoretical issues involved in regional sampling, such as the relationship between the question asked and the efficiency of different types of sampling that might be done, the mathematical implications that a particular sampling scheme has for descriptive statistics and statistical hypothesis testing, and the merits of different types of sampling designs. (28)

Redman, Charles L., PRODUCTIVE SAMPLING STRATEGIES FOR ARCHAEOLOGICAL SITES. There are numerous steps in the archaeological investigation of individual sites which can be made more efficient and reliable if a sampling strategy is employed. These include the initial surface collecting of the site, wall clearing when applicable, areas or rooms to be excavated, samples of soil to be screened or floated, and selection of levels and artifacts to be analyzed in detail. In all types of sampling it is necessary to make important decisions which are influenced by the expedition's goals, resources, the researcher's understanding of the archaeological material, and his knowledge of sampling design. Questions of sampling procedure, stratification of the population to be sampled, size of the sampling unit, and proportion of population to be sampled must be evaluated in such a way as to maximize usable results and not to carry on sampling for its own sake. (28)

Reid, J. Jefferson, THE ARCHAEOLOGIST AT WORK: PAST AND PRESENT. It is proposed that archaeologists can apply their method and theory to the study of material culture in modern industrial societies for the purpose of deriving explanatory statements of modern human behavior. This symposium theme is discussed as a promising research strategy within the framework of accepted archaeological procedure for investigating relationships between material culture and human behavior. (9)

Renfrew, Colin, THE LAW OF MONOTONIC DECREMENT. An empirical observation of trading patterns for reciprocal exchange may be generalized to give a very widely applicable "law." Departure from the law may be used as an indication of redistribution or other central-place trade. (21)

Reyman, Jonathan E., ARCHAEO-ASTRONOMICAL FIELDWORK. This paper discusses the formulation of archaeo-astronomical hypotheses and the equipment, techniques, and data necessary to test the hypotheses. (39)

Rice, Glen Eugene, SUBSISTENCE AND SETTLEMENT PATTERNS OF EARLY MASONRY HAMLETS—MOGOLLON TRADITION. A model of successive prehistoric settlement/subsistence systems will be proposed for the Mogollon tradition of east-central Arizona. Seriation and functional analysis of artifacts from early masonry hamlets of the Blue River will then be used to load the model in an attempt at explaining changes in distribution of Mogollon settlements through time. (23)

Riley, Thomas J., **AGRICULTURAL ARCHAEOLOGY IN HAWAII: ITS PROBLEMS AND PROSPECTS**. Agricultural practices of Neolithic societies have been treated on various planes by prehistorians. In some instances they have been virtually ignored in model construction; in others, detailed descriptions of fossil agricultural systems have played an important part in understanding cultural stability or change. It is argued here that a significant body of data relating to Hawaiian agricultural practices can be obtained through archaeological methods. The problems of agricultural reconstruction and its implications are probed. (10)

Rock, James T., **THE CONSTRUCTION UNIT IN A PREHISTORIC PUEBLO**. This report is a preliminary analysis of the investigation of a construction unit (a group of contiguous rooms) that was dug in total at Grasshopper (Ariz. P:14:1), during the 3 field seasons of 1970, 1971, and 1972. The report defines the concept of construction unit and its interrelation with the physical pueblo and then demonstrates its validity while probing into the possible related social behavioral unit that might have constructed the rooms and later lived in them. The project has 2 major thrusts: first, to demonstrate the existence of architectural units larger than a single room, and second, to investigate the social behavior correlated with the physical unit—the construction unit. (18)

Roe, Peter G., **THE PANOAN AFFILIATIONS OF THE CUMANCAYA COMPLEX**. Recent stratigraphic excavations at the site of Cumancayacocha, UCA-22, in the Peruvian montana have recovered a large sample of the Cumancaya ceramic industry. It exhibits many points of affinity with the pottery produced by modern Panoan-speaking riverine groups like the Shipibo-Conibo and the most developed ceramics of the inter-fluvial Panoans, those of the Cashinahua. In addition to these shared characteristics, a specific implement used in the ethnographically recorded and shreate female puberty ceremony was recovered from the Cumancaya midden. Since this ceremonial complex is an exclusive Panoan trait, the artifact's discovery, along with the other ceramic data, presents a good indirect argument for the Panoan linguistic affiliations of the Cumancaya complex. (30)

Rohn, Arthur H., **HOW WELL CAN WE SAMPLE ARCHAEOLOGICAL SITES?** Archaeological sampling procedures can be properly evaluated only by their abilities to predict the nature of the universes from which the samples are derived. Total excavation of the Gilliland site, a seventh century Basket Maker III settlement in southwestern Colorado, using a 2 m square grid permits an evaluation of several possible sampling procedures. Subjective selection of major features, trenching, artifact density plots, and selection of excavation squares by random numbers all would fail to predict significant settlement characteristics. (28)

Rosendahl, Paul, **ABORIGINAL AGRICULTURE AND RESIDENCE IN UPLAND LAPAKAHI, ISLAND OF HAWAII**. Recent research has defined an extensive dryland agricultural adaptation based on swidden cultivation of sweet potato and dryland taro on an intensive scale involving permanent field units. Representing an endpoint of agricultural development comparable only to the irrigated pondfield systems found in wet valleys, Lapakahi has several important implications for investigating the course of prehistoric cultural development in Hawaii. Utilizing an agricultural model emphasizing intensification as the principal process influencing agricultural growth and development, the Lapakahi investigations suggest that intensification of the agricultural system might well exemplify responses to complex socio-political pressures rather than simple population increase pressures alone. (10)

Rovner, Irwin, **TECHNOLOGY AND TYPOLOGY OF THE OBSIDIAN INDUSTRY AT MAYAPAN**. The Carnegie collections of obsidian from the site of Mayapan have recently been re-analyzed. The blade manufacturing process has been defined, and techniques of core rejuvenation have been recognized. Many blades were deliberately broken, probably by a punch technique, and were retouched into a variety of tool types including snubbed-nose scrapers, denticulates, burins, and so forth. (38)

Sanford, Patricia R., **A COMPARISON OF POLLEN ANALYTICAL DATA FROM FECAL AND SOIL SAMPLES: SOME IMPLICATIONS FOR ARCHAEOLOGY**. Human or other animal coprolites from archaeological sites are often subjected to pollen analysis in an attempt to learn something of the diet and ultimately the subsistence economy and environment of prehistoric peoples. No direct comparisons have been made between pollen analytical data derived from fecal material and the same data derived from soil samples. In the past, the assumption has been that data from soil samples yield macro-environmental interpretations, while data from fecal samples yield micro-environmental interpretations. This assumption is tested with analyses of modern fecal, and associated soil, samples of bear, deer, and elk and with archaeological fecal materials of putative human origins from a cave in eastern Oregon. (33)

Sargeant, Kathryn E., **REDFISH OVERHANG: A SURPRISING HASKETT SITE IN A GLACIAL-CONIFEROUS SETTING OF CENTRAL IDAHO**. New evidence of the Haskett Early Man tradition, usually associated with the High Lava Plains of southern Idaho and Oregon, is found in a glacial valley of central Idaho. A cache of preforms and a finished point, radiocarbon dated at 9860 B.P., illustrate the tool making technology in various stages of completion. In addition, there are earlier and later materials of the same tradition

at the site. Stratigraphy allows important inferences about climate and glacial retreat in the Sawtooth Mountains of central Idaho. (7)

Sarma, Akkaraju, and Barry A. Bogin, **CLIMATIC AND BOTANIC OBSERVATIONS FROM SOUTH COASTAL ECUADOR**. During the year 1971, south coastal Ecuador had over 31 in of rainfall, an amount much in excess of the normal. Such extensive rainfall has been thought to be in a 7 yr cycle along the Peruvian and Ecuadorian coasts, although departures from it are not unknown. A large number of plants were collected from Santa Elena Peninsula, Ecuador after the rainfall was over, new plants not local to the region have been identified. A discussion of the relevant environmental observations and botanical findings will be presented. (45)

Saxe, Arthur, **CULTURAL ECONOMICS AND ANTHROPOLOGICAL ARCHAEOLOGY**. (8)

Schiffer, Michael B., **UNDERGRADUATE CONTRIBUTIONS TO MODERN MATERIAL CULTURE STUDIES**. A recent class in archaeological interpretation at the University of Arizona permitted students to investigate relationships between material culture and behavioral-organizational variables of the United States. Several of these studies have implications for understanding the operation of complex industrial societies. This paper describes the results of several interesting projects. One study, exploring the relationship between social mobility, status symbol cost, and status symbol possession, uncovers an important positive feedback loop contributing to system disequilibrium and growth. (9)

Scholtz, Sandra, and Robert Chenhall, **NETWORKS OF ARCHAEOLOGICAL DATA BANKS**. The behavioral models which are the theoretical result of the analysis of archaeological data depend upon the availability of data to archaeologists. Some system which would facilitate the dissemination and exchange of information would seem desirable. A network of archaeological information exchange could function theoretically at a number of different levels, including: a tightly controlled common data bank system; a decentralized system which required no more than standardization of terminology and definitions; or a system which supplied only advice concerning computerizing and analyzing data. An evaluation of the practicality and/or desirability of the alternatives for research in archaeology necessitates an examination of the nature of and extent of the use of archaeological data for research purposes; the structure of the network itself should not restrict or dictate the structure of the research applications of the available data. (3)

Schuyler, Robert L., **PRE AND POST-INDUSTRIAL SOCIETY AND ARCHAEOLOGY AS THE SCIENCE OF MATERIAL CULTURE**. A number of archaeologists have recently discussed and in some cases called for a redefinition of archaeology as the scientific study of material culture irrespective of temporal position in contrast to the implicit traditional definition that would limit the field to the study of past societies. Such a redefinition seems to produce a number of serious problems; problems which, however, are only relevant to a "Looking Backward Attitude." If in contradistinction an evolutionary perspective is assumed, with industrial society being one of several developmental stages, then archaeology is in a position to make vital contributions to the study of modern society. In turn, such studies are predestined to have extensive and positive impact on the total discipline of archaeology. (9)

Shafer, Harry J., **DEBITAGE ANALYSIS AND REDUCTION SYSTEMS AT THE GEORGE C. DAVIS SITE, TEXAS**. Analysis of lithic debitage at the Davis site revealed that local lithic reduction strategies varied with respect to the raw material classes (flint, quartzite, silicified wood) which occurred in pebble and small cobble form. More importantly, findings demonstrated that many artifacts of non-local materials were not made at the site. However, one non-local resource, a natural glass, was brought to the site in nodular state. These data have aided significantly in testing propositions about the Davis site Caddoan cultural system and the scope of its interaction sphere. (2)

Sharp, Rosemary, **ARCHITECTURE AS INTER-ELITE COMMUNICATION IN PRE-CONQUEST VERACRUZ, OAXACA, AND YUCATAN**. Recent investigations strongly suggest that within a particular society great art is produced only when people having diverse interests and goals feel the need to communicate on an emotional level, in order to promote cooperation toward economic, political, or social ends. Striking similarities in the architectural decoration of monumental public buildings in Veracruz, Oaxaca, and Yucatan during Late Classic and Postclassic times suggests, first, that this theory can be extended to inter-societal relationships on an elite level, and, second, that the "greca" style functioned in a similar manner for participating and contributing peoples and cultures. (13)

Sheets, Payson D., **THE TWO CHIPPED STONE INDUSTRIES OF BARRILES, WESTERN PANAMA**. An archaeological project investigating the Barriles chiefdom, Chiriqui Province, Panama, was recently conducted. The chiefdom, located in the highlands between 4000 and 5000 ft, dates to ca. A.D. 300. The results of the analysis of lithic tools and wastage indicate the existence of 2 separate industries: flake tools and celts. The flake industry seems to be a household or cottage industry, directed toward the production of general cutting tools. The used flakes, wastage, and cores from this industry were encountered at all sites. Celts, on the other hand, were manufactured and resharpened only at the major sites. Celt manufacture

apparently was an emergent occupational specialization. The industries differ even in the nature of errors made in the direction and amount of applied force. (2)

Sheffer, Charles, **FOOD PROCUREMENT IN A SEMI-ARID PLAIN: A PROGRAMMED MODEL.** The model is designed as a dynamic simulation of a food procurement system based on non-mechanized gravity irrigation cultivation in a semi-arid alluvial plain. Such systems formed the economic base for early states in places like Mesopotamia, the Nile valley, and the Indus valley. Yield in such an agricultural system is determined primarily by environmental factors and secondarily by human agricultural practices. Utilizing methods developed by agricultural science and hydrology, the model generates agricultural yields under various combinations of environmental conditions and agricultural practices. These yields (with minor supplements from hunting and gathering) are used to predict the maximal enduring population which the area of application could sustain. Investigation can be made of the responses of agricultural yields and population to changes in the environment or in agricultural techniques, organization, or labor utilization. Oscillations in the system (i.e., temporal or spatial variation in key variables) are noted. The model is intended to aid in understanding the food procurement system which formed the economic base of early states in alluvial plains. (24)

Sidrys, R. V., **TRADE INDICES FOR UTILITARIAN IMPORTS OF THE CLASSIC MAYA.** It is suggested that the methodologies of recent models of Classic Maya exchange systems contain several sources of significant error. These include the use of artifact counts rather than artifact mass, and the neglect of artifact behavioral context and total excavation volume. In an alternative method, a trade index is presented that quantifies the magnitude of Maya utilitarian import volume per site. This trade index is the product of 2 variables, import density, and source distance. Specific utilitarian import data from several Maya sites are indexed by this method. (21)

Simmons, Michael P., **EXTERNAL TRADE AND ASH TEMPER IN NORTHERN YUCATAN.** Volcanic ash is a major tempering material for several common ceramic wares in northern Yucatan, although it is not known to occur naturally anywhere on the peninsula. Although its ultimate source is unknown, the distribution of this material has suggested the hypothesis that it was a valued trade import that was not equally available to all potters. Changes in its distribution may thus serve as an indicator of major shifts in trading patterns. (36)

Simons, Dwight, **FAUNAL REMAINS FROM NORTHERN CHILE.** The analysis of the faunal remains from 4 preceramic sites in the Tarapaca region of northern Chile is presented. Particular emphasis is focused upon the guanaco (*Lama guanicoe*) remains. Patterns of interrelationship are established via statistical analysis and are used to support inferences concerning utilization of guanaco by preceramic hunters in the Tarapaca region, as well as the shift from guanaco hunting to llama herding. (16)

Singer, Clay A., Robert O. Gibson, and Herrick E. Hanks, **LITHIC ANALYSIS AND SETTLEMENT PATTERNS IN THE UPPER SANTA CLARA RIVER VALLEY.** Recent archaeological research in the upper Santa Clara River Valley region of Southern California has focused on the development of the standardization of archaeological techniques for inferring site use and for investigating prehistoric settlement/subsistence patterns. Various techniques, including functional lithic analysis and cumulative frequency analysis, were utilized. Preliminary results are discussed. (34)

Singer, Clay A., **SELECTED COMMENTS ON THE ANALYSIS OF MESOAMERICAN OBSIDIAN BLADE ASSEMBLAGES.** In conjunction with the symposium on lithic analysis, this brief presentation is intended to stimulate discussion on the analytical methods used to interpret obsidian blade assemblages from Mesoamerica. Two aspects are examined; first, the various core forms and the blades derived from them, and second, the identification of tools produced on or from the various blade forms. Examples from both surface and sub-surface samples collected at the sites of Cuauhtitlan (Valley of Mexico) and Amapa (Nayarit, west Mexico) are provided for examination by symposium participants. Special attention is paid to empirically demonstrating the differences between 2 major artifact classes, knives and scrapers, i.e., separators and removers of material respectively. (20)

Sinoto, Yoshihiko H., **POLYNESIAN OCCUPATIONS ON PITCAIRN AND HENDERSON ISLANDS, SOUTHEAST PACIFIC.** A round-ended rectangular dwelling pit was uncovered on Pitcairn Island. It was constructed and used before A.D. 1360±105. A shelter on Henderson Island, known as an uninhabited raised atoll, yielded evidence of human occupation for 300 yr after A.D. 1160±110 before the settlers left; they had vanished from the island by the time the Spanish arrived in A.D. 1606. If the major dispersal in East Polynesia occurred from the Marquesas between A.D. 600 and A.D. 1200, it seems probable that Polynesians made landings on both Pitcairn and Henderson during that time. Especially Henderson was most likely discovered and occupied by the Marquesans. (40)

Skinner, S. Alan, **BURNED ROCK MIDDENS AND PREHISTORIC SETTLEMENT PATTERNS.** For over 30 yr enigmatic burned rock middens have been recorded, test-pitted, and trenched, but little attention has been given to the associated settlement patterns. During the past 2 yr, the Texas Archeological Society's Summer Field School in Archeology

has surveyed the Turtle Creek Watershed in order to test the hypothesis that the watershed represents a natural area within which the prehistoric inhabitants practiced all activities necessary for year-round maintenance of their society. The prehistoric settlement patterns show that burned rock middens are only a part of the settlement system within this natural area. (23)

Smith, Carlyle S., **A COMPARISON OF FIFTY BELL-SHAPED CACHE PITS AT THE TALKING CROW SITE, SOUTH DAKOTA.** The Talking Crow site is a multi-component habitation area in Fort Randall Reservoir, South Dakota, marked by numerous house depressions and a fortification ditch. Five components are identifiable: I, Plains Woodland tradition; II, Initial Coalescent Variant; III, Post-Contact Coalescent Variant; IV, Historic Dakota. Fifty bell-shaped cache pits, all filled with trash, are attributable to the 2 Coalescent components. No pits of any kind are attributable to Plains Woodland. Shallow basin shaped pits are attributable to Historic Dakota. The dimensions, cultural affiliations, and locations of the 50 bell-shaped pits were coded and punched on IBM cards. The results indicate that dimensions vary in relation to components and in whether or not the pits were found within or outside of dwellings. Also, it would appear that more bell-shaped pits were used in the Initial Coalescent variant than in the Post-Coalescent variant. (44)

Smith, Hale G., and Mark Gottlob, **SPANISH-INDIAN RELATIONSHIPS IN SOUTH-EASTERN GEORGIA AND FLORIDA.** This paper deals with the Spanish colonization of Florida and their contact and interrelationships with the Florida and Georgia Indians. The time period includes that from Ponce de Leon's voyage, A.D. 1513, to A.D. 1800. The initial contact, aside from discovery, appears to be that of procuring slaves. The main reason for the Spanish interest in Florida was military and protection of its trade routes. In order to attain Indian support, as allies as well as a means of foodstuffs and conversion of the Indians to Christianity, 2 mission chains were established. The initial mission chain extended into the Guale area of the present state of Georgia and was maintained by the Jesuits. Later, the St. Augustine-Fort San Luis chain was established and maintained by the Franciscans. Ft. San Luis is on the site of present Tallahassee, Florida. The Spanish, in addition to being militarily and mission oriented in their activities in Florida, also had a hacienda complex in operation. (19)

Snarskis, Michael J., **PILOT STUDY OF CERAMICS FROM CERRO CHIVO, ACAMBARO, A NEW SITE IN WESTERN MEXICO.** Preliminary analysis of sherds from 2 test pits at Cerro Chivo near Acambaro, Guanajuato, in western Mexico reveals a ceramic stratigraphy extending from pre-Classic to post-Classic times. Although some previously recognized types appear, local pottery traditions seem to predominate. Sherd lots from several potential phases are illustrated, and it is hoped that a better ceramic sequence for this area will be worked out in the near future. (5)

Spath, Carl D., **TOWARDS A MODEL FOR THE EMERGENCE OF INTENSIVE AGRICULTURE AND COMPLEX SOCIETY.** The most complete record of ancient botanical remains for the Andean region comes from the desert coast of Peru. There is little argument that the appearance here of specific cultigens and agricultural systems, though no doubt dependent on internal factors, was in response to more advanced systems external to it. A number of lines of evidence point to the tropical forest areas east of the Andes as an important source area for innovative development. In line with this suggestion, a model of development has been formulated with particular attention to the nature and characteristics of tropical root crops. The groundwork of this model lies in a fundamental modification and elaboration of the economic model of agricultural development presented by Boserup (1965) and tentatively applied to the developmental sequence of the coast of Peru by Patterson (1971). Attempts to apply this model in a truly developmental perspective have made it clear that levels of intensification of production are intimately interdependent with equivalent levels of intensification in the socio-political sphere. Thus the model proposes roughly equivalent "stages" in both domains on the assumption that economic and political intensification are integral features of the same process of change. Furthermore, I propose that political intensification tends, in most cases, to precede and precipitate the related economic changes. Population pressure, although indirectly generating causes for these changes, is more important in that population must reach threshold values of density for intensification to be effectively instituted. (32)

Spence, Michael W., **THE DEVELOPMENT OF THE CLASSIC PERIOD TEOTIHUACAN OBSIDIAN INDUSTRY.** The Teotihuacan Mapping Project has defined several obsidian workshops dating to the Late Preclassic Tzacualli phase. These are compared with Classic period workshops in terms of location, extent, items manufactured, etc., to determine the factors and processes involved in the development of the obsidian industry from its Preclassic to its Classic period form. (27)

Spielbauer, Ronald H., **CULTURAL USE OF THE LITHIC RESOURCE BASE IN UNION COUNTY, ILLINOIS.** Recent investigations into the aboriginal utilization of prehistoric environments, undertaken within a settlement pattern framework, have aimed at an identification and delimitation of the lithic resources available to the aboriginal occupants of Union County, Illinois, and adjacent areas. Further work has been aimed at determining differences in the acquisition and modification of these resources, most specifically chert, by the various archaeological cultures in the area through time. (34)

Stanislawski, Michael B., ETHNO-ARCHAEOLOGY AND SETTLEMENT ARCHAEOLOGY. Archaeological reconstruction of prehistoric settlement patterns may frequently over-simplify complex living situations. Archaeological, ethno-historical, and ethnographic data from the study of the Hopi and the Hopi-Tewa, of northern Arizona (A.D. 1400-1970) are briefly discussed concerning such settlement and settlement abandonment, problems as functionalism, priestly orders, water and land conflicts, local warfare, disease and health, invading groups, and economic pressures; while internal variation in any settlement may be due to rapid clan extinctions (in 50 yr or less), creation of new clans, clans using other clan's land or houses, emigration and disruption of ceremonial cycles, and exchange of craftsmen and architects between villages and tribes. (17)

Stickel, E. Gary, and Rainer Berger, A SPATIAL AND CHRONOLOGICAL ANALYSIS OF NEOLITHIC SETTLEMENTS IN THE ALPINE FORELAND OF SWITZERLAND. Recent underwater site surveys and test excavations in the lakes located in the environs of Zurich, Switzerland, produced data amenable to analysis of the chronology and settlement patterns of several Neolithic cultures. This study was conducted with the aim of gaining a better understanding of several Neolithic occupations both in terms of their respective temporal relationships and the factors inducing their settlement distributions. Our analysis used radiocarbon dating and a number of multivariate and other statistical methods. As a result a more refined absolute chronology was obtained, permitting a much better assessment of the processes which produced the human geography of this area. (23)

Stiles, Daniel, ASSESSMENT OF SIMILARITIES AND DISSIMILARITIES IN LITHIC ASSEMBLAGES: MNK CHERT FACTORY SITE AND HWK EAST AT OLDUVAI GORGE, TANZANIA. The MNK Chert Factory site and HWK East are both located in approximately the same stratigraphical level in Bed II at Olduvai Gorge. Chert is quite rare as a raw material in hominid occupation sites at Olduvai Gorge in Lower Pleistocene times except in a relatively narrow stratigraphical band in Bed II. An attribute analysis was performed on the material from MNK and using the same analytical procedures a similar analysis was performed on the whole chert flakes from HWK East. A comparison was then made of the whole flakes from the 2 sites and the resulting patterns suggest some sort of relationship between the 2 sites. (2)

Stohtert, Karen E., A METHOD FOR THE ANALYSIS OF TECHNOLOGICALLY SIMPLE STONEWORK. A technological study of lithic assemblages representing 6 cultural phases (including 1 preceramic phase) of coastal Ecuador demonstrates that production behaviors can be reconstructed by means of detailed analysis of primary flaking debris. (34)

Struever, Stuart, MODERN ARCHAEOLOGICAL RESEARCH STRATEGIES THROUGH THE PERSPECTIVE OF WPA ARCHAEOLOGY. This paper will use the WPA archaeological projects as the basis for reflecting on the organizational needs—and capabilities—of archaeology then and now. To what extent were the institutions, within which archaeology was conducted at the time, able to meet the salvage archaeology needs created by the public works projects of the 1930's? How does the failure to meet some of these needs reflect, more broadly, the failure of archaeology then and now to organize adequate manpower, expertise, and funds to conduct large-scale, long-term fieldwork? It will be argued in this paper that the history of the artifact assemblages collected by the WPA salvage projects reflects, in a microcosm, general limitations within the archaeological community in its ability to recover, process, curate, and analyze archaeological materials. (14)

Sussman, Robert W., PREAGRICULTURAL MOBILITY—A FACTOR LIMITING GROWTH IN HUMAN POPULATIONS. In gorillas, the spacing of births 3.5 to 4.5 yr apart is an important factor in limiting population growth. Such spacing seems to be a consequence of the long period of infant dependency and the need to carry the dependent infant while the troop is moving. In this paper, I suggest that a similar factor was important in checking human population growth in preagricultural times. In hunting and gathering populations, in which it is necessary to move constantly in order to obtain food, there will be limits on the number of children a woman can rear in her lifetime. I assume that in non-sedentary populations a woman, in most cases, must transport a child for at least 4 yr and that during this period she cannot nurture more than 1 child. Within this period, when needed, social spacing mechanisms were probably employed. However, once human groups became sedentary, these social spacing mechanisms were no longer a necessity. A woman could have and support a child as soon as an earlier one was weaned and the spacing between children allowed to reach maturity decreased. Thus, it is hypothesized that the increase in the human population in Neolithic times was as much due to the acquisition of sedentary habits as to changes in subsistence techniques. (1)

Symes, Martha I., CUSTER DIED IN VAIN: THE ARCHAEOLOGIST AND THE INDIAN TODAY. Within the last few years, there has arisen within the Indian community a great deal of resistance to archaeological fieldwork which deals with the Indian past. This paper will explore some of the complaints of the Indians and some of the possible solutions to the problems. (29)

Tamplin, Morgan J., LAND-INVENTORY RESOURCE DATA FOR ARCHAEOLOGICAL-ENVIRONMENTAL RECONSTRUCTION. A largely untapped data base compiled by the Canada Land Inventory may be useful in certain areas in the analysis of culture-environment

interaction systems. The data consist of large-scale mapsheets on which a standardized scheme of resource potential for forest, fish, wildfowl, and other resources is plotted. A system of quantifying and comparing the total resource potential of areas is discussed, and is applied to archaeological data from The Pas, Manitoba, and other sites along the Saskatchewan River. (41)

Tartaglia, Louis James, INFRARED ARCHAEOLOGY. Infrared photographic investigations were conducted to determine the capabilities, limitations, and future applicability of this remote sensor to archaeology in detecting cultural anomalies that are not discernible to the unaided eye. Systematic experimentation and subsequent photographic analysis of infrared emulsions revealed numerous features which were not recorded by conventional photographic procedures; thus, data acquisition was significantly increased both in field and laboratory photo interpretation. (39)

Taylor, Walter W., ARCHAEOLOGICAL TYPOLOGY AND PALEO-PSYCHOLOGY: A REPLY. Lewis Binford has called in question the usefulness, even the validity, of what he terms "normative" or "ideational" theory in archaeology. He has castigated the so-called normative school as "paleo-psychologists," for which role, he says, "most archaeologists are poorly trained." But the truth of the matter is that archaeologists are, as indeed they must be, paleo-psychologists . . . and this includes Binford as well as the rest of us. (17)

Thomas, David Hurst, THE BASIN I SIMULATION MODEL: TOWARD ARTICULATING ETHNOLOGICAL THEORY WITH ARCHAEOLOGICAL FACTS. This paper considers the more pragmatic aspects of the BASIN I computer simulation model. BASIN I was a semi-quantitative and primitive attempt to translate Julian Steward's theory of historic Great Basin Shoshonean settlement patterns into a set of archaeologically testable propositions. As with most simulations of this sort, the BASIN I model was severely restricted by the existing ethnographic reporting (especially with regard to material culture), by an imperfect grasp upon the behavior of critical environmental parameters and by the general lack of adequate controls to check how well the simulation runs mirror "reality." This paper also discusses the procedures necessary in this particular case to articulate archaeological field data with the computer output. (24)

Thomas, David Hurst, THE "HOW," "WHY," AND "SHOULD-HAVE-BEEN" OF SAMPLING IN THE REESE RIVER ECOLOGICAL PROJECT. Most of the fieldwork of the Reese River Ecological Project involved a sampling of the surface archaeological debris within a single valley system of central Nevada. Because almost no pragmatic guidelines for such sampling existed in 1968 when the research design was initially contrived, the effort was (and is) viewed largely as a shot-in-the-dark, a first approximation. A 10% stratified unequal cluster sampling technique was applied, using individual archaeological sites as sampling units, 500 m square tracts as clusters and modern vegetational lifezones as strata. In all, 140 such tracts were surveyed by a field crew which averaged about 34 individuals; this fieldwork required nearly 12 weeks. In other words, the field operations alone consumed more than 2000 man-days. The advantages, disadvantages, and cost of that sampling attempt are evaluated, with suggestions for improving subsequent work. (28)

Thomas, David Hurst, MICROWEAR STUDIES ON SOME ETHNOGRAPHIC NORTH AMERICAN HAFTED STONE TOOLS: PRELIMINARY FINDINGS. This working paper presents some preliminary findings of microwear investigation on 2 categories of ethnographic stone tools from North America. Several microscopic techniques have been utilized including variable wave-length lighting and scanning electron microscopy. Over 100 hafted Eskimo end scrapers were examined for consistent microwear patterns, and some correlations seem to emerge between function, edge angle, and stone type. In addition, a number of historic Plains Indian arrows and spears were studied to determine what sorts of wear, if any, appear on thrusting implements. If a consistent "random baseline" can be established, then further progress can be made toward separating prehistoric knives from blanks, from projectile points. (20)

Thomas, George B., DEMONSTRATING THE POT-HUNTER FACTOR: UNCONTROLLED, SELECTIVE TREASURE-HUNTING, AND CONTROLLED SURFACE COLLECTION NEAR MITLA, OAXACA. Recent work by McGimsey, Clewlow, and others makes clear the abundant potentials of public education concerning the crises in archaeology. Much as an applied anthropologist presents a mutually intelligible demonstration of the advantages or disadvantages of a program, an archaeologist can demonstrate the harmful effects of pot-hunting. Clewlow et al. (1971) did this by comparing pot-hunter collections with archaeological control collections in Nevada, and by publishing such results for popular consumption. Similarly, rudiments of a quantifiable and qualitative "pot-hunter factor" may be discerned following analysis of amateur and professional surface collections at an obsidian workshop site near Mitla, Oaxaca. (39)

Thomas, Prentice M., Jr., SETTLEMENT PATTERN SURVEY AT BECAN, CAMPECHE, MEXICO. During the spring of 1972 a National Geographic Society-University of Tennessee expedition led by this writer inaugurated the first season of prehistoric settlement study at Becan in the Rio Bec region of Yucatan. Clearing operations and mapping of remains of prehistoric domestic structures netted a total of over 1300 mounds or structures within the several square kilometers immediately surrounding Becan. First season results confirm a

surprisingly large, densely settled population radiating from Becan. Also, settlement remains at Becan seem unlike those previously reported from the Maya area in 2 respects. The survey turned up over 600 very small artificial mounds which surely served non-residential functions. Second the project located a series of variable sized artificial ridges for which several functions seem possible. (13)

Townsend, Joan B., EIGHTEENTH AND NINETEENTH CENTURY ESKIMO AND INDIAN MOVEMENTS IN SOUTHWESTERN ALASKA. A hypothesis regarding ethnic identities of peoples and population movements during the eighteenth and nineteenth centuries is developed from oral traditions, historical manuscripts, and archaeology. It is suggested that the current distribution of Tanaina Athapaskans and Aglegmuit Eskimos in the Iliamna Lake and interior regions of southwestern Alaska is a recent phenomenon. Tanaina penetrated the interior to the Stony and Kuskokwim Rivers in response to Russian fur trading stimulus while Aglegmuit moved into the Iliamna region impinging on Tanaina territory in response to inter-tribal hostilities elsewhere as well as the fur trade and slaving practices. (40)

True, D. L., ARCHAEOLOGICAL INVESTIGATIONS IN NORTHERN CHILE: PROJECT TARAPACA. Archaeological investigations in northern Chile over the past several years have resulted in the recovery of data that bear significantly on preceramic cultural developments in that region. A hypothesis is proposed that accounts for the extant settlement patterns in this region prior to 1000 B.C. These settlements are discussed in terms of the regional subsistence potential and data recovered from 5 separable cultural contexts that fall within this time period. (16)

Tuggle, H. David, MODELS OF AGRICULTURAL GROWTH IN ISLAND ENVIRONMENTS. Postulated increases in production pressure in pre-European Hawaii are considered in terms of theories of agricultural growth, particularly those of Brookfield, Boserup, and Geertz. Agricultural system responses are expressed as expansion versus intensification alternatives within natural and social island environments. Examples of generated archaeological models are presented. The testing emphasis is placed upon the elimination of theoretical models rather than on the identification of patterns suggested by ethnographic models. (10)

Tuohy, Donald R., A COMPARATIVE STUDY OF LATE PALEO-INDIAN MANIFESTATIONS IN THE WESTERN GREAT BASIN. One of the problems in the study of Desert West archaeology is the identification of Late Paleo-Indian manifestations in the Great Basin, and how these relate, if at all, to Plains-based Paleo-Indian groups of ca. 9500 B.C. to 6000 B.C. This paper summarizes and compares data from several surface and excavated sites located in the central and western Great Basin, and attempts a taxonomic ordering of these cultures or complexes based upon similarities and differences in stoneworking technology, as well as certain site features, and other data. (15)

Turnbull, Harold F., and R. E. Taylor, DIRECT DATING OF FOSSILS BY AMINO ACID ANALYSIS. Amino acids in living tissue each degrade to simpler compounds at a characteristic rate after the death of the organism. These degradation rates provide a potentially valuable chronometric indicator. The age of a fossil can be determined by measuring the ratio of living state amino acids to respective degradation products and employing the appropriate reaction rate constants. The feasibility of the method has been tested on a series of east African fossil elephant teeth ranging in radiometric age from 22 million to 5000 years. The amino acid dates thus far determined are discussed in comparison to accepted radiometric dates. (39)

Varner, Dudley M., and Richard N. Belding, ARCHAEOLOGY AND POST-CONQUEST SITES IN THE VALLEY OF OAXACA, MEXICO. Following the example of Charleton in the Teotihuacan Valley, studies have begun of ceramic technology, market systems and settlement patterns during the Colonial and Republic periods of the Valley of Oaxaca. Rural structures including haciendas and mills have been surveyed. Many are unoccupied and offer locales of productive excavations. In addition, colonial roads and Indian town sites abandoned in the historic period have been located. Their characteristics have important implications for the study of prehispanic settlement patterns. Continued archaeological investigations, coordinated with those of ethnography and ethnohistory, will increase our knowledge of aboriginal Oaxaca cultures and effects of the Spanish conquest on them. (35)

Vivian, R. Gwinn, and Robert C. Buettner, PRE-COLUMBIAN ROADWAYS IN THE CHACO CANYON REGION, NEW MEXICO. Recently a series of prehistoric roads and associated features including rock-cut and masonry stairways, ramps, and a bridge have been "rediscovered" in the Chaco Canyon area of New Mexico. These roadways form a network linking Chacoan towns and tying outlying colonies to a possible nuclear center in Chaco Canyon. Several hypotheses have been advanced for explaining the function of this non-Anasazi phenomenon including use for military movements and for ceremonial functions. The hypothesis that this network served to facilitate the movement of goods or services is considered. (36)

Voorhies, Barbara, ARCHAEOLOGICAL INVESTIGATIONS IN THE COASTAL ZONE, CHIAPAS, MEXICO. This is a preliminary report of investigations (January-March, 1973) of

shell mounds located on the Pacific littoral southwest of Esquintla, Chiapas. The mounds, forming islands of dry land in a mangrove swamp environment, are formed of large concentrations of the marsh clam, *Polymesoda* spp. Previous investigators reported nonceramic strata underlying ceramic strata. The study focuses on the lower material, in order to reconstruct the prehistoric culture of these early coastal peoples. (43)

Wagner, Erika, CULTURAL RELATIONSHIPS AND CHRONOLOGY OF SOME UNCLASSIFIED PHASES IN WESTERN VENEZUELA. Archaeological excavations of the El Jobal and Los Banos sites of the Valera-Agua Viva region (State of Trujillo) will be related with some ceramic phases, so far unclassified, such as Betijoque, on the basis of stylistic comparisons and Carbon-14 dates. These phases of the hot and dry tierra caliente environment will be compared with the Tierra templada and tierra fria zones. The new data will further clarify the culture history of the Intermediate area. (45)

Wallace, Dwight T., and Robert Carmack, STYLE AND STATE IN PERU: A SUGGESTED STRUCTURALIST APPROACH. Taking a broad, structural view of style, it is possible to postulate the presence of a style tradition running throughout Peruvian prehistory. Its validity rests on internal structure, but also on its historical reality. It contrasts with a northern (Chavin-Moche), southern highland (Tiahuanaco-Wari), and southern coastal (Paracas-Nasca) tradition. Given its similarity with tropical forest traditions, it may represent the older central Andean tradition. Regarding possible socio-political correlations, the history of the tradition suggests broad patterns of interaction and movement, with underlying themes such as a highland-coast dichotomy, an old passive versus new aggressive patterns, and broad underlying patterns contrasting with the multiplicity of states and reflecting on the formation and interaction of political units. (13)

Watanabe, Farley, VARIETIES OF IRRIGATION COMPLEXES IN WINDWARD KOHALA, HAWAII. Irrigation complexes in the windward valleys of Kohala, Hawaii, are examined in terms of size and formal types relative to topography and location. (10)

Weber, Ronald, CAIMITO PHASE CERAMICS OF EASTERN PERU. (30)

Weigand, Phillip C., TRADE PATTERNS FOR TURQUOISE IN MESOAMERICA AND SOUTHWESTERN UNITED STATES. Employing the technique of neutron activation, described at the 1972 SAA annual meeting, we have analyzed a substantially increased number of samples representing aboriginal quarries both of chemical and cultural "turquoise." "Turquoise" artifacts of known provenience have been examined and the elementary compositions compared to those of the sources already studied. The results offer some quantification of the aboriginal trade routes for this rare resource. (21)

Weymouth, John W., and Marnie Mandeville, X-RAY DIFFRACTION ANALYSIS OF HEAT TREATED CHERT. In order to elucidate the microscopic changes involved in heat treating chert an X-ray diffraction analysis was done on samples of chert heated to different temperatures. In each case as higher temperatures were utilized the X-ray diffraction lines became significantly broader. This is interpreted to mean that heating causes the extent of microscopic crystalline order to decrease or that the chert becomes more glassy-like. In fact it is possible to quantify the extent of this decreasing short range order in each case. The x-ray diffraction technique used and the significance of the results with respect to tool technology will be discussed. (20)

Whalen, Norman M., DELAYED ACCEPTANCE OF AGRICULTURE IN THE SOUTHWEST. Maize agriculture entered the Southwest during the Chiricahua stage of the Cochise culture about 200 B.C., but it did not become widespread until a century or two before the time of Christ. In the light of general systems theory, it is proposed that mutagenic changes in maize led to the adoption of maize agriculture on a wide scale by the San Pedro Cochise, with effects on other aspects of their culture culminating in their transformation into early Mogollon. (41)

Whallon, Robert, Jr., ARCHAEOLOGICAL TRAINING IN COMPUTER APPLICATIONS AND STATISTICAL ANALYSIS. Basic training in quantitative methods of data analysis and the use of the computer in archaeological research is offered in an advanced seminar. The stress is on the mastery of relatively simple statistics, computer use, and on developing a good understanding of the actual mechanisms or manipulations involved. Specific attention is given to the fitting of quantitative methods to archaeological problems. The basic premise is that understanding of the above will enable the student to make appropriate choices of quantitative procedures in particular research situations. The approach of this course is frequently eye-opening for students who begin to see "all sorts of possibilities" for analyzing archaeological data. The content and structure of the course are described, and its potential and place in the graduate training program are evaluated. (42)

White, Chris, METHODOLOGICAL AND TECHNICAL PROBLEMS INVOLVED IN THE ANALYSIS OF PATTERNS OF PREHISTORIC WARFARE. Drawing from current research in the Chevelon drainage area, Arizona, a number of interrelated problems of method and logistics related to an explanation of prehistoric warfare will be discussed. While archaeologists recognize the importance of understanding the "social environment" of the cultural unit or units under investigation, emphasis is usually placed on the more easily

defined and measured role of cooperation, while the role of conflict is frequently ignored. (40)

Wilcox, David R., SAMPLING PUEBLOS: THE PROBLEM OF COMPARABILITY. An analysis of what constitutes comparability among data sets is presented, as is an evaluation of the nature of the theoretical problem posed by an attempt to perceive social groups in pueblo sites and to study social change. A field strategy which will lead to recovery of comparable data sets adequate for solution of this problem will then briefly be discussed. (28)

Wildesen, Leslie E., A QUANTITATIVE FACTORIAL MODEL FOR ARCHAEOLOGICAL SITE DEVELOPMENT. Preliminary archaeo-chemical data from North American archaeological sites suggest that the interaction of cultural and environmental factors in site development can be expressed as a series of partial differential equations. Solution of these equations yields precise analysis of occupation history for any given site, and permits reconstruction of degree and rate of change of both culture and environment through time. (39)

Wilke, P. J., RECENT LARGE-SCALE ENVIRONMENTAL CHANGE IN THE SALTON BASIN, CALIFORNIA. Presently much concern rests on the archaeological implications of environmental changes in arid western North America. Frequently research aimed at environmental changes dwells on the reality of paleo-climatic events. The Salton Basin of eastern California underwent a change from aquatic to xeric conditions in the absence of significant climatic changes within the past 500 yr. Preliminary data on adaptations before and after the change, and the implications of the change, are presented. (31)

Wilkerson, S. Jeffrey K., PRE-COLUMBIAN SUB-CULTURE AREAS OF THE MEXICAN GULF COAST. Archaeological and historical literature frequently proposes or assumes a static bipartite or tripartite cultural division of the general Veracruz area in prehispanic times. Recent archaeological and ethnohistorical research in north-central Veracruz strongly suggests a twofold division in the Early Formative period that becomes fourfold by the Late Classic and Post-Classic periods. These subculture areas are seen as non-static entities both in terms of ethnicity and parameters. However, the areas do correspond to significant ecological, geographical, and social factors of a developmental nature. (35)

Williams, J. Raymond, PREHISTORIC ECONOMIC FOOD RESOURCE UTILIZATION ON TAMPA BAY. Excavations at a shallow shell midden on Tampa Bay reveal the extent of utilization of several econiches for food. Over 30 species of shellfish have been identified and are associated with various fresh, brackish, and salt water econiches. Faunal and floral remains also indicate the extent of the utilization of land resources. (41)

Williamson, Kenneth D., EDGE DAMAGE TO UNMODIFIED STONE FLAKES: A QUANTITATIVE APPROACH. Several controlled experiments were carried out to determine if substratum and other variables affected the degree to which unmodified stone flakes would be damaged when trampled under foot. Quantitative results of the pilot study suggest that several factors are responsible for edge damage of this type and these controlling variables can be differentiated. Implication and proposed future research are discussed. (2)

Wing, Elizabeth S., THE ROLE OF DOMESTIC ANIMALS IN THE ANDES. The native domestic animals—llamas, alpacas, guinea pigs, and dogs—each play a number of roles in the lives of people of the Peruvian Andes. Data from archaeological excavations augmented by ethnographic information are being used to define these roles and outline changes in the use of these animals throughout time. Three distinctive patterns of animal use are identifiable: the early (before about 2000 B.C.) high valley (between 2000 and 4000 m elevation) use of guinea pigs and dogs; the high puna (over 4000 m elevation) almost exclusive use of lamoids; and in more recent times (since about 1000 B.C.) increased use of herding animals in the high valley economy. (41)

Wiseman, Frederick, THE ARTIFICIAL RAINFOREST: A MODEL FOR OPTIMUM PRODUCTIVITY IN LOWLAND MAYA AGRICULTURE. A possible alternative to Milpa or Ramon cultivation is the creation of a system simulating the highly efficient Mesoamerican rainforest, which stresses simultaneous cultivation of root crops, shrubs, and trees. A combination of selective clearing and shortened fallow cycle will eventually result. The simulated rainforest would be productive as well as stable over time due to chemical plant defenses, heterogeneity, and availability of alternative paths for energy flow. The cultural implications include the necessity for organizing large labor forces at given times, external trade in valuable woods and chemicals, and use of the ritual calendar for recording information on crops with life cycles measured in decades. We have generated test implications from the model which can be compared against geochronological and biological data obtained from sediment cores taken in the Peten. (37)

Wobst, H. M., NEOLITHIC POPULATION, SETTLEMENT AND ACTIVITY PATTERNS. (24)

Workman, William B., DATED TRACES OF EARLY HOLOCENE MAN IN SOUTHWEST YUKON, CANADA. 1966 excavations at the Canyon Site (JfVg-1) yielded a small collection of artifacts at a depth of 7 ft beneath modern ground surface. This assemblage, consisting of 2 thin round-based projectile points (1 burinated), a thick biface fragment, and 2 fragments of Bison sp., is dated at 5245 B.C.±100 (SI-1117). This paper compares the Canyon finds with other material from southwest Yukon whose roughly comparable age can be surmised on other than typological grounds, places the material in geological and paleo-environmental context, and compares it with material of comparable age in adjacent areas to evaluate its broader significance. (7)

Wright, H. T., and M. A. Zeder, THE SIMULATION OF LINEAR RECIPROCAL TRADE SYSTEM UNDER EQUILIBRIUM CONDITIONS. The purpose of this simulation was to demonstrate that message-free reciprocal exchange of goods between egalitarian communities will not operate unless at least 2 types of goods move through the system. These two types are the so-called "useful" commodities which are used in a fixed ratio to population, and the so-called "status" or "socio-technic" or "symbolic" goods which need not be used in fixed ratio to population. If the flow of the latter type is produced as a set function of the producer's population and is exchanged from community to community at a constant proportion of goods received, then all producers are receiving information about the condition of this producer's community. This information can be used in a very simple fashion to regulate the production of demographically linked goods destined for the other producer. The simulation uses populations, goods, and rates derived from western New Guinea linear exchange systems as an example. The types of cycling in goods production at the producing communities and in intermediate communities elucidates the "trade cycles" of the midwestern Late Archaic period discussed by Howard Winters in *New Perspectives in Archaeology*. (24)

Yanguez-Bernal, Juan A., THE NAZARATEGUI TRADITION IN THE NEGUACHI RIVER, UPPER PACHITEA, PERU. Research report of my archaeological investigations on the Neguachi River, a tributary of the Pachitea River, tropical forest of Peru. A previous research was done on the Nazarategui River, which runs parallel to the Neguachi River, by William L. Allen who developed a sequence starting with the Cobichaniqui complex (1600 B.C.) and ending with the historical Pichis complex. The Nazarategui tradition comprises the following complexes: Cobichaniqui, Pangotsi and Nazarategui. I am working toward (a) a better definition of this tradition, (b) a comparison with Allen's material, and (c) finding out if possible some relationships with other South American ceramic complexes. (30)

Yesner, David R., ALEUTIAN SUBSISTENCE-SETTLEMENT SYSTEMS: THE SOUTH-WEST UMNAK FOCUS. With respect to the Aleutian ecosystem as defined by W. S. Laughlin, in which both environmental and cultural uniformity through time and space has generally been the rule, little attempt has previously been made to establish functional differences in prehistoric settlement patterns as related to (1) different microenvironments within the larger ecosystemic framework, and (2) seasonal configurations of faunal availability. Through faunal and technological analysis, a comprehensive picture of the regional integration of subsistence and settlement patterns has been achieved, indicating that small, temporary "camp" sites are normally utilized for highly specialized subsistence purposes, and remain integrated with larger, year-round central base villages, but that in times of population expansion at the central base, these "camp" sites shift in orientation to year-round settlements for wider subsistence purposes. Furthermore, through discriminant analyses on stone tools associated with faunal clusters, it is possible to determine functional tool-kits which enable prediction of the specialized activities at "camp" sites for which there is no bone preservation. (23)

Young, James, A., Raymond A. Evans, and Paul T. Tueller, GREAT BASIN PLANT COMMUNITIES—PRISTINE AND GRAZED. The composition and structure of pristine plant communities in equilibrium with the environment of the Great Basin before European colonization has been obscured by a century of intensive grazing. An accurate reconstruction of these communities would serve as a benchmark for interpretation of climatic changes in the recent geologic past and for determining their potential productivity. We will discuss the influence of domestic livestock on plant communities of 5 broad vegetation zones in the Great Basin: mountain brush, pinion/juniper woodland, sagebrush, salt desert, and alkaline sink. (12)

Young, Jon Nathan, INVENTORY OF ARCHEOLOGICAL RESOURCES AND ENTRIES INTO THE NATIONAL REGISTRY OF HISTORIC LANDMARKS. (29)

Ziegler, Alan C., Richard H. Brooks, and Sheila Brooks, EARLY FAUNAL AND CULTURAL CORRELATIONS IN THE GREAT BASIN. Archaeological sites of the Great Basin area contain some of the oldest stratified cultural sequences in North America. The faunal sequences for most sites have not been emphasized, especially the correlation of appearance or disappearance of a particular animal form from the Great Basin sites. This correlation is valuable to archaeological research as marked variation in the faunal inventory of a site through time may provide the explanation for contemporaneous changes in the cultural patterns. Also dates of occurrence of a particular animal from a few sites with radiocarbon dating and stratigraphic control could be used as chronological and cultural indicators. (15)

Zubrow, Ezra, **THE SIMULATION OF PREHISTORIC REGIONAL SYSTEMS**. This paper considers some general problems of simulation and its application to prehistoric regions. Regional definitions and their applicability to the generation of simulated settlements and communication in time and space will be discussed. Also, various models will be tested against actual data from the United States and Mexico. (24)

Zucchi, Alberta, and William M. Denevan, **PREHISPANIC AGRICULTURAL FIELDS IN THE VENEZUELAN SAVANNAS**. Archaeological excavations of prehispanic ridged fields in the Barinas area have proved their artificial origin and also revealed their internal structure, size, disposition, and soil characteristics. In addition, the location and testing of several prehispanic settlement sites in the surrounding area allow the formulation of new hypotheses regarding the group who built these features and the probable factors that caused the implantation of this agricultural system in the western Venezuelan Llanos. (30)

Zuidema, R. T., **TIMUCUA KINSHIP AND SOCIAL ORGANIZATION**. (19)

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