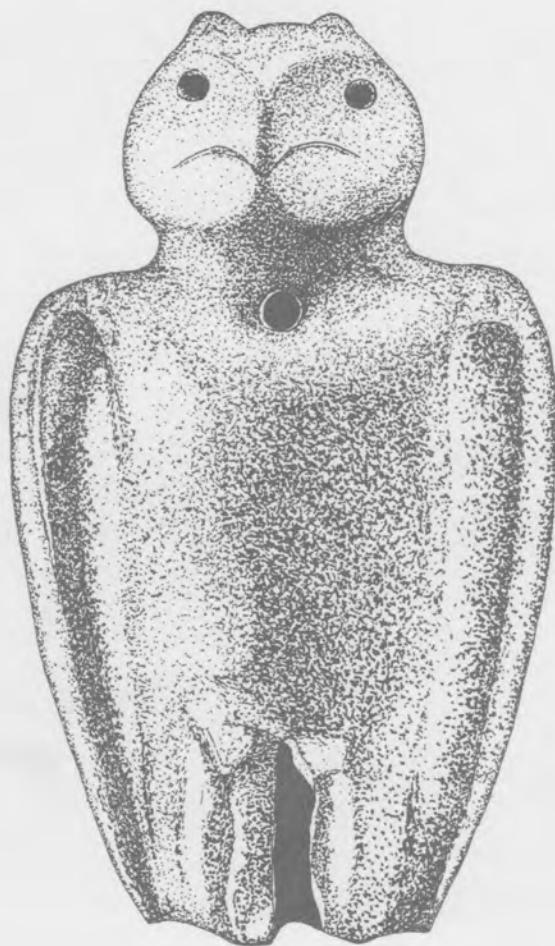


SOCIETY FOR AMERICAN ARCHAEOLOGY



**ABSTRACTS
of the
57th Annual Meeting**

April 8–12, 1992
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The annual meeting of the Society for American Archaeology provides a forum for the dissemination of knowledge and discussion. The views expressed at the sessions are solely those of the speakers and the Society does not endorse, approve or censor them. Descriptions of events and titles are those of the organizers, not the Society.

Cover: Owl effigy pipe of Ohio Pipestone, Madisonville Site, by Martin T Fuess.

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**SOCIETY FOR
AMERICAN ARCHAEOLOGY
Fifty-Seventh Annual Meeting**

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ABSTRACTS OF SYMPOSIA

[1] SOCIETIES IN ECLIPSE: PITTSBURGH AND ENVIRONS AT THE DAWN OF COLONIZATION.

Between AD 1450 and 1700, Native American populations throughout the Eastern Woodlands experienced massive upheavals. Regional depopulation, the development of pan-tribal organizations, shifting political alliances, and the emergence of new economic priorities resulted. While European colonization of the Northeast and Southwest played a tremendous role in disrupting traditional Native American societies, populations in interior areas removed from direct European contact experienced disruption at the hands of their Indian neighbors. This symposium focuses on these changes, emphasizing the social dynamics within and between various parts of the eastern woodlands at the dawn of history.

[101] SECTION 106: AN ARCHAEOLOGICAL PERSPECTIVE.

Section 106 of the National Historic Preservation Act requires that federal agencies take into account the effects of their undertakings on properties eligible for, or listed on, the Register and to afford the Advisory Council a reasonable opportunity to comment with regard to a project. In the last twenty-five years the Section 106 review process has become a formal procedure for deciding the fate of archaeological and traditional cultural properties. This symposium addresses common standards that are practiced for federally mandated investigations and examines whether the implementation of the 106 process results in justifiable research.

[102] SOCIETIES IN ECLIPSE: EASTERN NORTH AMERICA AT THE DAWN OF COLONIZATION.

Between AD 1450 and 1700, Native American populations throughout the Eastern Woodlands experienced massive upheavals. Regional depopulation, the development of pan-tribal organizations, shifting political alliances, and the emergence of new economic priorities resulted. While European colonization of the Northeast and Southwest played a tremendous role in disrupting traditional Native American societies, populations in interior areas removed from direct European contact experienced disruption at the hands of their Indian neighbors. This symposium focuses on these changes, emphasizing the social dynamics within and between various parts of the eastern woodlands at the dawn of history.

[103] INTRASITE SPATIAL PATTERNING IN THE PALEOLITHIC OLD WORLD.

Although a large number of Old World Paleolithic sites have been examined for spatial patterns and structure over the last 20 years, the methods used and the results achieved are extremely diverse and have never been synthesized adequately. This symposium brings together those working with a variety of approaches and analytic methods in a manner that allows comparisons to be made between different sites and regions. Such an examination of the range of variability in intrasite spatial patterning as it changes with time and region is a necessary step in building our understanding of how Paleolithic peoples used and organized their spatial landscape.

[104] PLANTATIONS ON THE PERIPHERY: THE ARCHAEOLOGY OF SMALL SLAVEHOLDING SITES.

Archaeological research regarding slavery has focused primarily on large plantations of the Lowland or Tidewater South. This research has provided a critical comparative base for the analysis of slave material culture and social relations within the plantation hierarchy. However, the archaeology of slavery in the South rarely has addressed sites outside the Tidewater and Lowland areas. This symposium explores the archaeological record of non-plantation slave sites or small plantations located in the peripheral areas of the South.

[105] HOUSEHOLD ARCHAEOLOGY IN SOUTHERN MESOAMERICA: THE CERÉN SITE, EL SALVADOR.

The eruption of Laguna Caldera volcano rapidly buried the Classic period Cerén site, preserving organic and inorganic artifacts *in situ* along with structures, gardens, and *milpas*. Households, as co-residential adaptive groups, coordinate functions of production, sharing and redistribution, reproduction, and transmission. Each household built multiple structures for particular purposes, including domiciles, storehouses, and kitchens. Other buildings had public or specialized functions. The sophistication of adobe residential architecture in southern Mesoamerica, with large platforms, cornices, lintels, and even a dome and a window, was hitherto unsuspected. Multidisciplinary research includes volcanology, geophysics, archaeology, botany, and conservation.

[106] The Essential Skills of Archaeology

[106] THE ESSENTIAL SKILLS OF ARCHAEOLOGY.

Although archaeologists and educators have made attempts toward including archaeology in the pre-college curriculum, the most appropriate avenues must still be located. Even the most enthusiastic teachers find it challenging to cover basic requirements in more than a perfunctory manner. How does archaeology fit? Where should it be taught? And which essential skills are included in an archaeology lesson? What message do we as archaeologists want to teach? This symposium proposes a deviation from the norm. Papers presented include tangible lessons integrating archaeological materials and methodologies in the public curriculum. The symposium is a hands-on, activity-based information session.

[107] SMALL SCALE WORLD-SYSTEMS IN PREHISTORIC NORTH AMERICA.

The papers in this symposium examine regions and interconnections in prehistoric North America to address questions posed by the comparative world-system perspective. How were processes of local and regional hierarchy-formation impacted by inter-group and inter-regional interactions such as intermarriage, communications, trade, and warfare? What were the temporal and spatial dimensions of interaction networks, and how did these affect local processes of social change? Were there core/periphery hierarchies in some regions? What are the structural and processual similarities and differences between these relatively small scale world-systems and the larger scale systems found in other times and places?

[108] SOCIAL DYNAMICS OF THE PREHISTORIC CENTRAL MEDITERRANEAN.

Italy and its neighbors in the Central Mediterranean have some of the richest material remains available in the Old World for the study of prehistoric and protohistoric, as well as classical, archaeology. This symposium attempts to synthesize some recent anthropological approaches to research in the Central Mediterranean. As both the content and complexity of the region's archaeological data base have increased, so has the efficacy of innovative methodologies for analysis and interpretation of these data. The papers presented here examine fundamental areas of inquiry, including settlement pattern analysis, gender relations, ideology and power, resource exploitation, and evolving social asymmetries.

[109] EL NIÑO SOUTHERN OSCILLATION EVENT, ENVIRONMENTAL CONSTRAINTS, AND THE GEO-ARCHAEOLOGICAL RECORD IN THE CENTRAL ANDES.

El Niño is defined as the appearance of anomalously warm water in the Pacific Ocean off South America for at least four consecutive months. Meteorological disruptions induced by strong El Niños are disastrous; rainfall regimes are dislocated for a year or more, and oceanographic changes determine qualitative and quantitative alterations of the trophic levels of the biomass of the Pacific litoral. Any natural disaster that alters environmental conditions should be of interest because the consequences can be regional in scope with populations subject to concurrent stress. We proposed the present symposium as an effort to review and update current research focused on climatological crises in the central Andes during archaeological times.

[201] GRANT WRITING: A STUDENT'S GUIDE.

The purpose of this workshop is to demystify the grant writing process for students and to offer helpful guidelines and advice to those preparing grants for the upcoming year. The participants present twenty minute talks, with the discussion focusing on summaries of granting institutions, the function of the grant proposals, developing a successful proposal: common problems and reasons for rejection, and foreign student grant possibilities. The discussions are followed by a question and answer session.

[202] THE REALITY OF REPATRIATION: ISSUES IN IMPLEMENTATION.

Congress has recently enacted two laws that radically affect the roles of and relationships among archaeologists, museum specialists, Native Americans, and physical anthropologists. The National Museum of the American Indian Act (1989) and the Native American Graves Protection and Repatriation Act (1990) restructure control over the archaeological record and provide a legal framework for the repatriation of human remains, grave goods, and objects of cultural patrimony. This symposium brings together an array of people who are directly affected by the evolving interpretations and practical implementation of these laws.

[203] BUILDING METHODOLOGY FOR AN EVOLUTIONARY ARCHAEOLOGY.

Building evolutionary theory for archaeology is not an end in itself, but a means to generate a coherent body of knowledge about the history of human societies. The process of theory building is fundamentally methodological and hinges on constructing methods and models to guide description and explanation. Evolutionary explanations are distinct, and the fundamental issue is methodological—how to evaluate a contemporary record in such a way as to infer change and process. These papers address creation and measurement of units, methods, and models, when the methodological

[301] Contested Landscapes: Is the Past a Foreign Country?

implications of Darwinian theory are extended to explanation of variability in the archaeological record.

[204] LATE PREHISTORIC SUBSISTENCE-SETTLEMENT CHANGE IN THE NORTHERN EASTERN WOODLANDS.

Subsistence-settlement systems of non-Middle Mississippian late prehistoric groups of the Eastern Woodlands have traditionally been viewed as adaptations to environments marginal for maize agriculture. This characterization has been challenged by a number of researchers who stress the interrelationship of environmental and social risks on adaptation. This symposium examines late prehistoric subsistence-settlement change in the northern Eastern Woodlands from this perspective. Nine cultural areas are examined in a transect from the Mississippi River in southwest Wisconsin to the Delaware River in Pennsylvania. This transect provides an opportunity to examine the effects of environmental and social risks in a variety of environmental and cultural settings.

[205] ANASAZI ORIGINS: RECENT RESEARCH ON THE BASKETMAKER II.

This session brings together scholars investigating Anasazi origins. The focus is on the Basketmaker II period, especially those aspects that predict or differ from later Anasazi adaptations and organization. Recent research suggests stronger connections with later Anasazi than were previously recognized, as well as clear differences. Further, a wide range of dates and variation within the Basketmaker II period are now recognized. Papers present recent findings on a wide variety of adaptational and organizational themes.

[206] PREHISTORIC WORLD-SYSTEMS: THEORY, DATA, AND DEBATE.

In recent years world-systems theory has become a widely employed, if hotly debated, perspective for exploring social evolution and the economic, political, and social ramifications of inter-societal interaction. Although these kinds of interactions often are discussed by archaeologists, world-systems theory has not been extensively used in archaeological research, particularly in the Americas. This symposium introduces world-systems theory to Americanist archaeologists, provides several examples of research conducted within a world-system perspective, and attempts to kindle some debate about the utility of world-systems theory in contemporary archaeological research.

[207] MID-THIRD MILLENNIUM SECONDARY STATE FORMATION IN NORTHERN MESOPOTAMIA.

The process of secondary state formation in northern Mesopotamia can now be defined in terms of chronology, rates of socio-political change, class formation, regional settlement reorganization, climate change and environmental adaptation, agricultural production and distribution, change in artifact manufacture and distribution, and changes in the acquisition of exotic metal supplies. At 2600 BC secondary state formation was a sudden and synchronous process across Southwest Asia, from Ebla to the Indus, induced by the "expansion" of the ED III southern Mesopotamian economy.

[216] RETHINKING THE QUINCENTENNIAL: CONSEQUENCES FOR PAST AND PRESENT.

The work of North American archaeologists has been crucial in shaping popular as well as academic understandings of how contact and colonial expansion has transformed the Americas since 1492, not surprisingly, a great many of them have been drawn into the events and enterprises designed to mark the occasion of the Columbian Quincentennial. In recognition of this, the SAA sponsored three extended symposia, in 1988, 1989, and 1990, on "Columbian Consequences"—now published by the Smithsonian (edited by David Hurst Thomas)—which brought together the results of archaeological and historical research that treats the legacy of European-American contact from a variety of perspectives. The Plenary Session of the 1992 Annual Meeting of the SAA will not attempt to cover this ground again; it will not be a summary of current thinking about the various episodes and contexts that comprise "Columbian contact" and its consequences. Rather, it takes as its point of departure a recognition of the radically diverse—"artificial, disjointed" (DHT 8), widely contested and thoroughly perspectival—nature of the accounts and understandings that were presented and discussed in these sessions, and asks what implications this has for the future practice of archaeology in the Americas. More specifically, it is intended to raise a series of questions about the socio-political entanglements and consequences of archaeological research as, itself, part of the legacy of contact.

[301] CONTESTED LANDSCAPES: IS THE PAST A FOREIGN COUNTRY?

David Lowenthal's *The Past is a Foreign Country* raises a host of issues of great relevance to the archaeologist and the public at large. How we view the past, both our own past and that of other peoples, directly affects how we use and misuse it in the present. The past is not a neutral or value-free concept. Whether viewed as exotic (positive) or danger-frought (negative), the relegation of the past to the status of foreign country often has alarming political, economic, and social consequences for the present. In this symposium we examine the pasts (real and recreated) that we professionally

[302] Testing the Prufer Model

study with emphasis on problems of ethnic and national identity, dependency relationships, and implicit evolutionism.

[302] TESTING THE PRUFER MODEL OF OHIO HOPEWELL SETTLEMENT PATTERN.

In the 1960s Olaf Prufer advanced a hamlet model of Ohio Hopewell settlement in which dispersed, sedentary agricultural farmsteads clustered around geometric earthworks located in the center of a community. The papers in this symposium explore various facets of Prufer's model, including degree of sedentism, pattern of dispersion, subsistence strategy, and earthwork-burial-settlement relationships. They are based upon data acquired largely during the last decade, much of it unpublished, and go far toward bringing knowledge of the Ohio Hopewell area up to par with other areas of the Eastern Woodlands in which Middle Woodland settlement pattern data have been available for some time.

[303] NEW LIGHT ON OLD ART: ADVANCES IN ROCK ART RESEARCH.

Recent advances in dating, field techniques, and interpretive approaches contribute to make rock art research increasingly valuable as an adjunct to other aspects of the archaeological record, especially for the reconstruction of hunter-gatherer religious and symbolic systems. A series of these advances are presented in this session, focusing on western North America. These include cation-ratio AMS radiocarbon dating, rock art site excavations, contextual/distributional studies, and iconographic, gender-based, and ethnographic analyses.

[304] HISTORIC AND PREHISTORIC CHANGES IN ZUNI SOCIAL ORGANIZATION.

Among the outstanding research questions in the American Southwest is the nature of late prehistoric and early historic Puebloan social organization. Systematic efforts to reconstruct key aspects of Zuni social organization are presented, which draw on archaeological work undertaken on and adjacent to the Zuni Indian Reservation over the past decade. The theory and method behind reconstructing social organization is a prime concern. Papers encompass a range of perspectives and utilize innovative analytic approaches to the study of mortuary, settlement pattern, lithic, ceramic, and architectural data to better understand the processes of economic development, political dynamics, and social structural change.

[305] HIGH ALTITUDE ARCHAEOLOGY IN THE NEW WORLD.

This symposium brings together those archaeologists working in high elevation (over 2500 m) areas in both North and South America to provide a two continent view on how high altitude areas were integrated into the prehistoric regional organizational and mobility strategies of hunting and gathering populations. The research and ideas presented in this symposium materially add to our understanding of the range of variability exhibited by prehistoric human populations using these environments.

[306] COASTAL-HIGHLAND INTERACTION IN PREHISPANIC OAXACA.

This symposium provides the first synthetic examination of the nature and social impact of coastal-highland interaction in prehispanic Oaxaca. The papers document that the Oaxaca Coast was an important corridor for communication and commerce with the highlands. Coastal resources such as shell, cacao, and cotton were sought by highland populations. Formative-Classic period interaction between the coast and the highland centers of Monte Albán and Teotihuacan are examined, as is the role of the Ejutla Valley as an intermediary in coastal-highland interaction. The impact of the Postclassic coastal city-state of Tututepec on the highlands is discussed.

[307] SUBSISTENCE AND ENVIRONMENTAL CHANGE IN OCEANIA.

The islands of Oceania provide natural laboratories for the study of evolutionary change because they vary in their ecological complexity and relative isolation. Islands also vary in their histories of human occupation, with colonization dating from the Pleistocene to modern times. In this regard, archaeological research on floral and faunal assemblages in Oceania traces the evolution of human subsistence and the associated impact on island environments. Documenting subsistence and environmental change requires solving problems of recovery, quantification, and comparability. In this symposium we address these methodological issues and their link to theoretical models in island settings.

[308] BEYOND THE ELITE: OLD KINGDOM ARCHAEOLOGY AND THE GIZA PLATEAU MAPPING PROJECT.

The archaeology of Old Kingdom Egypt has long focused on the elite members of society. This perspective has profoundly limited attempts to examine the development and working of this early state. Drawing on the results of recent excavations at the Giza Plateau and other sites, the papers in this symposium begin to correct this imbalance by focusing on the economy, subsistence, and social organization of Old Kingdom Egypt.

[407] Lowland Maya Agriculture and Environment

[401] PUBLIC ARCHAEOLOGICAL SCIENCE WORKSHOP.

Most of our archaeological information about America's paleoenvironments, prehistory, and history today comes from projects conducted in response to public land use laws. Each such project provides some scientific information, but the quality and quantity of those data, and their use in synthetic scholarship, is uneven. These discussions are an opportunity to share information about ways to enhance the quality of public archaeological science, within the constraints of cultural resource management requirements and the realities of limited fiscal resources, and diminution of nonrenewable scientific information.

[402] CULTURAL AND ECOLOGICAL DIMENSIONS OF ANTHROPOGENIC ENVIRONMENTS AND PLANT DOMESTICATION.

The recipient of the 1992 Fryxell Award for Interdisciplinary Research is Richard A Yarnell, selected for his contributions to ethnobotany and archaeology. Professor Yarnell has increased the understanding of human-plant interactions through rigorous analysis, key publications, and dedicated teaching. This Fryxell Symposium demonstrates Professor Yarnell's profound intellectual influence, particularly in the application of ecological and cultural perspectives to studies of humanly modified environments and agricultural evolution. The participants present results of research in Japan, Peru, the western United States, and eastern North America from the Canadian subarctic to the Gulf of Mexico.

[403] GREAT TOWNS AND REGIONAL POLITIES: CULTURAL EVOLUTION IN THE US SOUTHWEST AND SOUTHEAST.

This session presents comparative analyses of sociopolitical development both within and between the US American Southwest and Southeast. The comparisons are done within the framework of a multiscale perspective, focusing on questions about successively larger scales of analysis: How great were the southwestern and southeastern great towns? How complex were their polities? How were their polities organized? What kinds of ties bound these polities together into macro-regional systems? What kinds of ties did the southwestern and southeastern macro-regions have with Mesoamerica? The concluding papers evaluate how well current evolutionary models explain southwestern and southeastern sociopolitical development.

[404] THE ORGANIZATION OF STONE TOOL TECHNOLOGIES.

Studies of technological organization attempt to understand how technological strategies are linked to environmental conditions and prehistoric behavior. Technological organization is determined through a consideration of raw material procurement, manufacture, use, reuse, and discard of tool types as related to social, economic, and environmental factors. In this symposium, investigations of prehistoric stone tool assemblages utilizing an organization of technology approach are presented. New perspectives on the study of technological organization are advanced, and the utility of employing an organizational approach to prehistoric stone tool technologies is demonstrated.

[405] INFLUENCE, INTEGRATION, OR INCORPORATION: RECENT RESEARCH ON THE TIWANAKU PHENOMENON OUTSIDE THE CORE AREA.

Existing data have long suggested a significant diffusion of Tiwanaku style artifacts to parts of Bolivia, southern Peru, and northern Chile beyond the Tiwanaku altiplano homeland. Only recently, however, has a body of problem-oriented research focused on the nature of Tiwanaku economic, political, and cultural dominion across the South Central Andes. This symposium brings together recent research from Peru, Chile, and Bolivia on the expansion and peripheral integration of Tiwanaku (AD 350-1000). The diversity of the Tiwanaku phenomenon is represented as it relates to trade, colonization by altiplano Tiwanaku settlers, or some other form of state or imperial hegemony over indigenous inhabitants.

[406] PUBLIC EDUCATION AT ARCHAEOLOGICAL PARKS: DOING IT EVERY DAY.

Archaeological parks (i.e., archaeological sites that have been preserved and opened for public visitation) hold a unique place in public education precisely because of their daily contact with the public. Maintaining a year-round educational program that can impart knowledge to visitors from diverse backgrounds and ages, while continuing to attract return audiences, offers special opportunities and problems for on-site educators and archaeologists. Participants discuss the history and development of such sites, as well as the exhibits, reconstructions, special events, and tours that reflect the range of methods used to educate the public at archaeological parks.

[407] LOWLAND MAYA AGRICULTURE AND ENVIRONMENT.

Mayanists can now debate questions of environmental change in the Maya Lowlands and human impact on the landscape with significant new data from soil science, geology, palynology, limnology, macrobotanical remains, and agroecology. These data demonstrate early forest clearance and reveal a fresh perspective on crops grown, plants utilized, and degree of forest cover through the course of

Maya prehistory and history. Information on sea level rise and climate change is presented. Agricultural limiting factors, effects of erosion in the Late Classic period, and Maya responses are discussed. Use of data on modern farmers is investigated.

[408] CONTINUITIES AND DISCONTINUITIES IN EUROPEAN SETTLEMENT SYSTEMS.

Current European archaeology emphasizes investigation of settlement sites and settlement systems. Increasingly fine chronologies enable us to pinpoint times of establishment and abandonment of settlements. Through analysis of patterns of continuity and discontinuity, it is possible to address anthropological and historical questions about changes in subsistence practices, migrations to and from regions, and effects of such events as the Roman conquest. Papers here explore questions of continuity and discontinuity in settlement systems from the Late Bronze Age into the Middle Ages, in relation to changes in other aspects of human culture.

[409] HOUSEHOLD STATUS IN AN INDUSTRIAL SETTING: PRELIMINARY FINDINGS FROM THE EAST LIVERPOOL DATA RECOVERY PROJECT, 1800-1930.

In 1990 urban archaeology was conducted in East Liverpool, Ohio, a major ceramics manufacturing center, as part of an Ohio Department of Transportation CRM project to investigate the social and industrial development of the community. A series of eight sites, comprising residential units, commercial establishments, and two early potteries, were excavated to provide data to examine both the development of the ceramics industry and the nature of status differentiation between the various groups comprising the city's workforce. This symposium presents an overview of the project and assesses the implications of current perspectives on social status in archaeological research.

[413] TECHNOLOGIES FOR PREHISTORIC AND HISTORIC PRESERVATION.

The rapid development during the last two decades of new methods, techniques, and equipment has greatly facilitated archaeological research and cultural resources management. This symposium explores new technologies for dating, geographic information, and protection from looting and vandalism, many of which were originally developed in the natural sciences and engineering and "transferred" to archaeology. The symposium also examines how new technologies relate to cultural resources management and to the development of more effective public policies for funding and managing archaeological research.

[501] PHYTOLITH ANALYSIS IN THE 1990S: APPLICATIONS IN ARCHAEOLOGICAL INTERPRETATION.

Continuing research in phytolith analysis increasingly shows the wide applicability of the method to archaeological questions. Diet, farming techniques, animal husbandry, domestication processes, site formation processes, and climatic reconstruction are a few of the various topics able to be addressed through phytolith analysis. This symposium focuses on botanical information and new extraction methods useful for the interpretation of phytolith data in relation to archaeological objectives and goals. Recent case studies illustrate the application of phytolith analysis at archaeological sites and indicate that phytolith analysis is a robust methodology.

[502] ADVANCING SCIENCE THROUGH FIELD SCHOOLS ON NEW MEXICO'S PUBLIC LANDS.

A productive partnership has developed between the New Mexico Bureau of Land Management (BLM) and academic institutions, private research foundations, and graduate students. Funding provided by the BLM is enabling more field schools to be held on public lands than ever before. This symposium presents research results from a diverse set of seven field schools. These include excavations and research at two 19th-century military forts, Navajo pueblos, a classic Mimbres pueblo, a Mogollon rock art site, pithouse villages, and large P-IV pueblos. Advances in southwestern archaeology made possible by these cooperative projects are explained.

[503] THE LATE CERAMIC AGE IN THE NORTHEAST CARIBBEAN.

The Late Ceramic Age (AD 600-1500) in the Northeast Caribbean (from Puerto Rico in the Greater Antilles to Montserrat in the northern Lesser Antilles) is not well known despite considerable research on many islands. Archaeologists from Europe, the Caribbean, Canada, and United States compare their research on 12 islands/island groups in the region. The goals of the symposium are to: (1) identify the common elements that link and the dissimilar elements that separate various islands; (2) examine variability in site densities and settlement patterns; and (3) explore prehistoric sociopolitical organization in the region, especially as it relates (or perhaps does not relate) to the complex societies (chiefdoms) in the Greater Antilles and the post-Saladooid culture in the southern Lesser Antilles.

[504] ARCHAEOLOGY "IN" AND "OF" CITIES.

Sponsored by the Urban Archaeology Group and inspired by method and theory discussions at the Group's annual workshops, this symposium addresses the current status of archaeology in American

cities and offers directions for future research strategies. Included are two case studies describing cultural resource management programs in Alexandria, Virginia, and Pittsburgh, Pennsylvania.

[505] SOCIOECONOMIC PERSPECTIVES ON ANCIENT TEOTIHUACAN.

The ancient city of Teotihuacan, Mexico, was the most complex urban center in Mesoamerica during the Middle Horizon (AD 200-750). Over the years numerous archaeological projects have contributed to an understanding of this vast metropolis. The symposium participants integrate these earlier studies with recent research and present new interpretations, and alternative models, of the social and economic structure of the city, focusing particular attention on social groups, domestic institutions, occupational specialization, production activities, health, poverty, and politico-religious ideology.

[506] SEASONALITY AND SEDENTISM: COMBINING NEW AND OLD WORLD PERSPECTIVES.

Issues of seasonality and sedentism form a significant part of current research involving "complex" hunter-gatherers and early agriculturalists in both the Old and New Worlds. In both areas there is a growing awareness of the complexity of the concepts of seasonality and mobility, and the development of new techniques to try to evaluate settlement patterns. However, work in the two areas has proceeded largely independently. The papers in this session combine methodological, theoretical, and case studies to explore these shared issues in both the Old and New Worlds and to examine the diversity of approaches to address them.

[507] SMALL STATES: CASES OF DIFFERENT PARADIGMS.

Most constructs for state formation and development stem from analyses of large states. But these models of centralization, hierarchical development, institutional integration, etc. often fail to possess any explanatory power in the analysis of small states. Small states are different. They can possess qualities such as heterarchical organization or incomplete formation, which rarely figure into models of large state organization and change. This symposium seeks to isolate useful paradigms for the study of small states and illustrate their archaeological approaches.

[508] FAUNAL EXPLOITATION IN CHIEFDOM LEVEL SOCIETIES.

Differences in economic organization between chiefdoms and simpler societies are manifested at the community and regional levels in various aspects of the archaeological record, including faunal remains. Chiefdoms should be distinguished from simpler societies by indicators of status differentiation and specialization, and intersite variability. The papers in this symposium explore faunal exploitation in chiefdoms of varying complexity, including both hunting and gathering and agriculturally based groups, with particular regard for organizational complexity.

[512] CORRELATING ARCHAEOLOGY AND LINGUISTICS: ALGONQUIANS AND IROQUOIANS.

At European contact, Algonquians of the Great Lakes were separated from their linguistic relatives along the Atlantic Coast by Iroquoian tribes, who spoke completely unrelated languages. Ethnologists and linguists have long recognized the implications of these historic distributions, but archaeologists, until recently, have tended to ignore them. Papers in this symposium examine the archaeological record with the goals of identifying prehistoric ethnic/linguistic groups, describing their movements and interactions, and developing theoretical models for migration, population replacement, and linguistic diffusion.

[601] ARCHAEOLOGY FOR THE PUBLIC.

The SAA has recognized the need to encourage the dissemination of archaeological information to the public, as well as encourage interaction between archaeologists and the public. This session is the second one to be held at the Society for American Archaeology annual meetings, organized specifically for the public. Presentation topics include the search for the Columbus landing site, the impact of European contact on Native Americans, and archaeology in western Pennsylvania. Comments are provided by representatives from the SAA and the Pennsylvania Bureau of Historic Preservation. Awards will be presented to the winners of the SAA-sponsored student essay contest. A question and answer period follows the presentations. The session is free to the public. SAA members are encouraged to attend and interact with the public.

[602] LIFESTYLES OF THE RICH AND COMMON: THE CONJUNCTIVE APPROACH TO COPAN ANCIENT HISTORY.

Traditional Mayanists emphasize epigraphy and elite history, rather than settlement systems and population histories. This symposium presents a methodological overview and a synthesis of mature research results from the Pennsylvania State University's Copan Archaeological Project. The project

[603] The Emergence of Cultural Complexity

is a long-term study designed to address questions regarding cultural evolution and human adaptation to a tropical ecosystem. Participants discuss the diverse analytical methods employed, including paleopathology, agronomy, palynology, energetics, spatial analysis, obsidian hydration dating, and ethnography. These independent research results are shown to be complementary, thus demonstrating the value of a conjunctive approach to archaeological research.

[603] MODELS AND THEORIES ON THE EMERGENCE OF CULTURAL COMPLEXITY.

Several decades of intensive research on the dynamics of states and complex chiefdoms have generated important advances. Attention is increasingly focused on models and theories which seek to explain the emergence of middle-range sociopolitical complexity and ascribed social inequality. This symposium presents current theoretical developments, critiques of existing paradigms, and recently acquired data from several regions of the world. Models pertaining to both complex hunter-gatherer and agricultural societies are featured. Contributions center on the theme: what are the causes, consequences, and legitimate archaeological correlations of the appearance of complex organizations in prehistory.

[604] SETTLEMENT AND SUBSISTENCE IN THE LATE ARCHAIC AND EARLY CERAMIC PERIODS OF THE SOUTHERN SOUTHWEST.

The late preceramic and early ceramic periods in the southern Southwest witnessed many new adaptations. These included new land use strategies, generally resulting in decreased mobility, and the adoption of cultigens. These changes occurred at different times and to different degrees in the diverse desert environments of the southern Southwest. The papers in this symposium examine these crucial time periods. They draw on data from different regions and combine land use studies focused on mobility strategies with subsistence studies focused on the impacts of the adoption of agriculture.

[605] WHO WAS WHO? TRACING ETHNICITY ALONG THE IROQUOIS-ALGONQUIAN BORDERS IN PREHISTORY.

American archaeologists conventionally assume that discrete ethnic groups may be traced back into the past by continuities in material culture. Paramount in such endeavors has been the assumption that material culture provides reliable indicators of traditional practice and ethnic continuities. In the Northeast, the *in situ* model of Iroquoian prehistory is built on that premise. The northeastern literature is displaying renewed interest in such questions, and the time is ripe for thoughtful consideration of the fundamentals. The speakers address ethnicity and ethnic signalling around the borders of the Iroquoian speakers, emphasizing the concepts and reasoning appropriate to the problems.

[606] THE HISTORIC CHESAPEAKE: FROM FRONTIER ECONOMY TO URBAN TENEMENTS.

The Chesapeake's economy, ecology, and history make it an extraordinarily rich area for archaeological study. The various papers in this session provide an overview of current research in Chesapeakean archaeology. Inter-ethnic relations and class conflict are themes that play a major role in many of these papers. Relationships among Native Americans, Europeans, and African Americans are clearly critical for understanding the historic Chesapeake. Class and social conflicts among economic groups, occupational groups, and regional groups are important as we strive to understand changing social and political situations, including stratification within cities, between urban and rural areas, and between the old world and the new.

[607] MISSISSIPPI VALLEY PALEOENVIRONMENTS AND CULTURAL CHANGE: INTERDISCIPLINARY STUDIES IN SOUTHEASTERN IOWA.

An interdisciplinary research program is focusing on environmental and cultural changes in a portion of the Mississippi Valley in eastern Iowa and adjacent areas. Paleobotanical and geomorphological investigations have defined trends in local and regional climatic patterns, vegetational changes, and landscape evolution. Joint geological and archaeological work has focused on alluvial fans as sources of data on landform development and buried Archaic and Early Woodland occupations. Near-surface Woodland communities have been intensively investigated. The symposium papers present the results of this effort to understand both the natural and cultural parameters of the prehistoric Upper Mississippi Valley.

[608] OPERATIONAL SEQUENCES AND PREHISTORIC TECHNOLOGY.

The 1980s saw the emergence of new theoretical and methodological approaches to the study of prehistoric techniques by American archaeologists, in part due to influence from European anthropologists, ethnologists, and prehistorians. The working definition of technology employed by many archaeologists has been expanded from the traditional concern with the form and function of artifacts to include a concern with culturally and historically conditioned choices of techniques and materials, as well as regional and interregional aspects of raw material procurement. This new way of thinking

[704] Issues of Archaeological Method and Theory

about technology is embodied in research that attempts to reconstruct and understand entire operational sequences from choices of raw material through production, use, and discard. This symposium presents several examples of progress in this important area of research.

[609] UNRAVELING THE GORDION KNOT: NEW EXCAVATION AND SURFACE SURVEY AT YASSIHÖYÜK (GORDION) TURKEY.

The mound called Yassihöyük has been identified as historic Gordian. Excavation from 1950 to 1973 exposed the Phrygian capital ruled by Midas, destroyed c. 700 BC. Current research is focused on recovery of environmental and economic data within a controlled stratigraphic sequence. Between 1500 and 100 BC, texts suggest Hittite influences, occupation by Indo-European speaking Phrygians, and conquest by the Persians, Alexander, and the Romans. Qualitative and quantitative shifts in floral remains, fauna, and material culture provide a new understanding of the changing economic and political role of the site and its people.

[615] WPA: WHAT PRICE ARCHAEOLOGY?

This year marks the fiftieth anniversary of the end of the Works Progress Administration, one of the most ambitious governmental programs of the Roosevelt years. Despite its impact at the time, the role of the WPA is little understood today. The Committee for the History of Archaeology sponsors this session to heighten awareness of the continuing importance of past archaeological work and to underscore the ways in which records of past work can be utilized. The session explores the WPA accomplishments, its legacy, and its contributions, both actual and potential, to the discipline of archaeology. Following the brief prepared talks, speakers and audience will engage in a candid, wide-ranging discussion.

[701] COMPREHENDING SOCIOPOLITICAL COMPLEXITY: NEW APPROACHES TO TONTO BASIN PREHISTORY.

The elaboration of sociopolitical structures in the Tonto Basin, Arizona, has been a perennial issue of regional scope. Until recently, the absence of intensive scientific excavation has limited the debate to speculation regarding this and the broader issue of the Salado phenomenon. The situation has changed dramatically as three independent scientific teams have joined in one of the largest research programs in the history of American archaeology. The teams have very different missions, analytical orientations, and data bases; nonetheless, they share an interest in measuring complexity and understanding its environmental, technological, and social underpinnings. Papers describe the various approaches to these issues and discuss preliminary findings.

[702] PUBLIC PROJECT ARCHAEOLOGICAL SCIENCE AND RESEARCH.

Public archaeology is usually accomplished under a series of management constraints with limited funding in specified geographical areas. A common complaint is that such restrictions inhibit research potential and project quality. A number of sound and successful public archaeology research programs have been accomplished. The results and contributions of these are evaluated and discussed.

[703] FROM BROKEN POTS TO AIRLINE TRASH: RECONSTRUCTING HUMAN BEHAVIOR AND BEYOND.

Behavioral Archaeology, now about 20 years old, was introduced as a program for the development of archaeological method and theory. Is behavior an appropriate analytic unit for archaeological research? What theoretical approaches are most appropriate for reconstructing and understanding behavior in the archaeological record? Is there a future for a behavioral approach in archaeology? In this symposium, these and other questions are addressed by individuals with diverse experience and theoretical backgrounds. Through a combination of case studies and theoretical exercises, an assessment is made of a behavioral approach and recommendations are offered for development or redirection.

[704] LAND HOLDING, TENURE, AND BOUNDARY MAINTENANCE: ISSUES OF ARCHAEOLOGICAL METHOD AND THEORY.

This symposium brings together a diverse set of studies that address the problem of understanding prehistoric land holding practices and community boundaries. The geographical focus is broad, including archaeological and ethnographic research from the South Pacific, the Andes, lowland Mesoamerica, the American Southwest, northwestern Europe, and West Africa. Land holding practices are discussed in terms of agricultural intensification, access to resources, socio-economic integration, ancestor worship, warfare, trade, and hydraulic organization. The emphasis of each paper is to link a well documented archaeological data base to a theory of how and why people partitioned prehistoric landscapes.

[705] INNOVATIVE APPROACHES TO CULTURAL RESOURCE MANAGEMENT IN THE NORTHEASTERN UNITED STATES.

This symposium addresses methodological and theoretical changes occurring in cultural resource management in the northeastern United States. CRM as discussed here refers to research, activities, and programs that seek to conserve, protect, and interpret historic and prehistoric archaeological resources. The symposium papers reflect the diversity and commonality of approaches to CRM as represented by "academic," contract, and avocational archaeology, and preservation planning. Topics include: innovations in sampling and analytical procedures, revised modeling and interpretive frameworks, recent strategies for site protection and management, effective ways to increase public awareness of and public involvement in archaeological research, and retrospective and prospective evaluative views.

[706] TERMINATION AND DEDICATION RITUALS IN THE ARCHAEOLOGICAL RECORD: INTERPRETING THE GEOGRAPHY OF SACRED SPACE IN ANCIENT Mesoamerica.

Recent archaeological investigations of Precolumbian monumental structures have revealed the presence of patterned assemblages of selected material phenomena. Within a more contextual framework, the authors in this symposium explore the role of ideology in structuring the alteration and/or deposition of these cultural materials. Attention is focused on the role of these objects in rituals of termination or dedication in which sacred place was manipulated to activate or contain power. This ritual complex has considerable time depth in Mesoamerica, from the inception of cultural complexity through the period of European contact.

[707] CONTRIBUTIONS OF THE US ARMY CORPS OF ENGINEERS TO NORTH AMERICAN ARCHAEOLOGY.

The Corps of Engineers has played an active and extensive role in the identification, evaluation, and management of our nation's archaeological resources. Considerable archaeological work has been completed in support of Corps projects nationwide. This symposium draws on the extensive corpus of archaeological work completed by the Corps and demonstrates, through papers presented by Corps archaeologists, contract archaeologists, and academicians, the contributions the Corps of Engineers has made to the science of archaeology. Particular focus is given to contributions in the following areas: geoarchaeology, GIS applications, regional archaeological contexts, and site preservation.

[708] SOCIETAL STRUCTURE: REFLECTIONS IN METAL.

Societal complexity can be characterized by internal and external relationships based on the production and exchange of valuable goods. The existence of craft specialists, the hoarding of artifacts, and the control of their redistribution and meaning by non-manufacturing segments of a population can assist in the identification of social stratification and cultural contact. This symposium explores how the production, use, and exchange of iron and bronze can be used to indicate levels of status within societies and extent of interactions between communities. The geographic regions to be examined are central and northern Europe, Africa, Asia, and North America.

[709] COASTAL FOG, LIFTING: RECENT CONTRIBUTIONS TO THE STUDY OF COASTAL ADAPTATIONS IN SOUTHERN NEW ENGLAND.

New perspectives on prehistoric and early historic period Native American adaptations to the coast of southern New England are provided from recent archaeological investigations in Massachusetts, Connecticut, and Rhode Island. Papers in this symposium include analysis of individual site excavations, site distributional studies, ethnohistory, folklore, and paleoecological, paleobotanical, and faunal research. Many previously "foggy" areas in our understanding of changing adaptations to coastal and estuarine environments are made more "clear" through new discoveries and the diversity of research approaches used by the authors in this symposium.

ABSTRACTS OF PAPERS

Abbott, Alycia L & Robert D Leonard (New Mexico)

[304] EXPLAINING VARIATION IN PUEBLOAN LITHIC TECHNOLOGY: PRELIMINARY ANALYSES FROM ZUNI, NEW MEXICO.

Much attention has been paid in recent research to distinctions between the lithic technologies of mobile versus sedentary groups. Differences in such aspects as core technology and the presence of flake technology have been interpreted as indicative of group location along a mobility/sedentism continuum. Such analyses often assume that once groups are fully sedentary and focused on agricultural production, variation in lithic technology is minimal. Using materials from Badger Springs in the Zuni area of western New Mexico, we argue that this simple dichotomy of core/flake technologies is insufficient to account for the variation exhibited, and offer an alternative framework.

Abbott, Lawrence (New South Associates)

[707] THE EFFECTIVENESS OF STRATIFIED CLUSTER SAMPLING FOR RIVER BASIN SURVEYS: EXAMPLES FROM SOUTHWEST VIRGINIA AND SOUTH-CENTRAL NORTH CAROLINA.

Stratified cluster sampling is a standard and widely accepted methodology for estimating site densities within large tracts of land. This method often is used for projects involving cultural resource management because it is cost effective and reliable for statistical analysis. This method recently was used within the Upper Smith River Basin in Virginia and the Rocky River Basin in North Carolina. The results of these surveys and the usefulness of this sampling method as a resource management tool are discussed. Particular emphasis is placed on the special situations created by river basin surveys in terms of the statistical universe and the effects on the interpretations of settlement patterns.

Abrams, Elliot (Ohio)

[602] ARCHITECTURAL ENERGETICS AND THE STRUCTURE OF SOCIAL POWER AT LATE CLASSIC COPAN, HONDURAS.

A model of sociopolitical relations for the early Maya state of Copan, Honduras, which combines stratified, ranked, and egalitarian statuses, is described. One means of testing this model—architectural energetics—is detailed. The energetic analysis translates architecture into its energy equivalence as a means of refining the observation of settlement hierarchies as reflections of relative social power. The results of this analysis confirm that the Late Classic Copan Maya did establish political institutions endemic to the early state. Finally, potential applications and refinements to the energetic method are discussed.

Ackerly, Neal (New Mexico State)

[110] PREHISTORIC SETTLEMENT VARIABILITY AROUND PLAYA MARGINS IN THE JORNADA DEL MUERTO, NEW MEXICO.

Playas have long been argued to play a crucial, if sporadic, role in settlement strategies during the prehistoric period in southern New Mexico. This paper presents the results of a controlled comparative study of prehistoric settlement patterns around three playas ranging from 20-585 acres in size. Analyses rely heavily on reconstructed hydrological fluctuations and dated pollen spectra indicative of paleovegetation changes. By linking these data with archaeological findings, this study demonstrates that prehistoric settlement intensity varies directly with the periodicity of wet-dry cycles.

Ackerman, Robert (Washington State)

[513] AN ENDURING CULTURAL TRADITION? MICROBLADE TECHNOLOGY IN NORTHWESTERN NORTH AMERICA.

The recovery of microblades from late site contexts (last 3000 years) in Alaska raises several questions—is this the result of cultural mixing, are the radiocarbon dates reliable, is it possible that microblade technology, derived initially from an Asian cultural base 11,000 to 10,000 years ago, continued into recent times, or has there been a reintroduction from some unknown source long after the tradition disappeared? The cultural complexes of northeastern Asia, Alaska, and the Northwest Coast are explored in an attempt to provide insights into the prehistoric contexts and chronology of the microblade tradition.

Adams, Karen R (Crow Canyon)

[506] ARCHAEOBOTANICAL INDICATORS OF SEASONALITY.

Modern observations on the seasonality of plant resource availability in a region provides critical background for interpreting seasonal patterns of acquisition in prehistory. Good examples of seasonal

indicators described in the American Southwest include reproductive parts, vegetative parts, and cases of plant/insect inter-relationships. Condition of parts, associations of seasonally specific taxa, and complementarity of data sets can combine to make a strong case that season of acquisition may also equal season of use. The pollen in human coprolites offers yet another way to evaluate seasonal plant use by humans.

Adams, Karen R (see Ciolek-Torrello, Richard S) [701]

Adler, Michael A (see Harris, John) [110]

Adler, Michael A (Southern Methodist)

[704] LAND TENURE SYSTEMS AND PREHISTORIC LAND USE: PERSPECTIVES FROM THE AMERICAN SOUTHWEST.

Land tenure systems socially mediate human access to important resources, and as such, are important in any consideration of past human settlement and land use. However, the concept of land tenure must be differentiated from the archaeological concept of land use. While land use is the actual modification and utilization of the surrounding environment, land tenure is the system utilized to gain access to important resources. This paper attempts to bridge this gap between the archaeological interpretations of land use, and our understanding of land tenure systems, through the application of cross-cultural observations on land tenure to archaeological data on long-term land use from the American Southwest.

Adovasio, J M (Mercyhurst/SMU), Olga Soffer (Illinois-Urbana-Champaign) & Dennis Dirksmaat (Mercyhurst)

[211] FLOTATION SAMPLES FROM MEZHIRICH, UKRAINE: A MICROVIEW OF MACROISSUES.

Analyses of flotation samples from the ca 15,000 BP Upper Paleolithic site of Mezhirich have produced new insights into site use and occupancy issues. Fine fractions from extramural pits have yielded worked and unworked wood, concentrations of burned and unburned microtine bones, fragments of ivory, and such exotics as amber and gagat. Furthermore, microlithic debitage is scarce and suggests in-house lithic production of artifacts. Finally, flotation also produced a variety of plant food remains as well as a fragment of the oldest cordage yet recovered from the Old World. All these materials are described and quantified, and their potential significance is addressed in terms of site use patterns and processes.

Adovasio, J M (see Soffer, Olga) [211]

Ahler, Stanley (North Dakota/NAU)

[515] RELATIVE AGE OF KNIFE RIVER FLINT ARTIFACTS AS MEASURED BY UV FLUORESCENCE.

Intensity of patination (visible surface weathering) has been recognized for some years as a meaningful measure of relative age in Knife River flint artifacts. The absence of patination is not an indicator of recent age in KRF artifacts. A pilot study of ultraviolet fluorescence shows a strong correlation between age and intensity of fluorescence in unpatinated and lightly patinated KRF artifacts. This study, focused on time-diagnostic projectile points from the Lake Ilo area in western North Dakota, offers significant expansion of relative dating techniques applicable to KRF artifacts.

Aimers, Jim (Trent)

[209] RECENT INVESTIGATIONS INTO THE MAYA E-GROUP PROBLEM.

Maya E-Groups are monumental architectural assemblages considered since the 1920s to have been used for solar observation. Recent investigations have located at least 14 additional E-Group assemblages aside from the 29 previously published. Summer solstice observations at six of the sites suggest that the accuracy of these observatories may vary considerably. The E-Group problem raises questions about both the nature of Maya astronomy and the process through which archaeological hypotheses become accepted as fact.

Aldenderfer, Mark (UC-Santa Barbara)

[305] FORAGING ADAPTATIONS IN THE SOUTH-CENTRAL ANDES: 11,000-4000 BP.

Foraging adaptations from 11,000-4000 BP in the high-elevation environments (3000-4700 m) of the south-central Andes of southern Peru and northern Chile are characterized by the following general stages: initial entry, colonization, relative stability, and transformation. Each of these stages is characterized by variability and flexibility in the scale and frequency of residential mobility, size, and constitution of the co-resident group, change in diet breadth and composition, and relationships with adjacent populations. The tempo of these observed changes, as well as the causal factors that lie behind them in this mountainous environment, are explored.

Alexander, Rani T (New Mexico)

[610] COLONIALISM, RISK REDUCTION, AND THE YUCATEC MAYA.

Colonialism severely affects the risk reduction strategies of the colonized as a result of the appropriation of land and labor for the production of cash crops. Changes in the Yucatecan colonial economy produced changes in risk reduction strategies of the indigenous population which are reflected in archaeological patterns of settlement and household organization. This paper attempts to identify the principal risks and changes in settlement in the Early Colonial period, marked by demographic decline and the introduction of cash crops, and in the Late Colonial period, marked by demographic recovery and the introduction of a market system and cash economy.

Allaire, Louis (Manitoba)

[503] THE LATE CERAMIC AGE IN THE NORTHEAST CARIBBEAN: THE VIEW FROM THE WINDWARD ISLANDS.

The post-Saladoid of the northeast Caribbean (Leeward Islands) differs significantly from the larger Windward Islands to the south (Martinique through Grenada), which developed the distinctive Troumassoid-Suazoid sequence also reflective of mainland interaction. The Leeward Islands may have been more closely related to poorly known Guadeloupe and Dominica. Population movement between the Leewards and the Windwards may have been active, and the northeast Caribbean islands may have served as stepping stones for Taino influences in the Windwards.

Allen, Kathleen M (Ithaca)

[509] EXTERNAL RELATIONSHIPS OF THE NIAGARA FRONTIER IROQUOIS.

Contacts between groups within the Five Nations Iroquois and the Huron Confederacy have been documented. Contacts between members of these confederacies and other ethnic groups are less well understood. This paper focuses on clarifying relationships between one of these more marginal groups (located in the Niagara Frontier region of New York state and most often identified as the eastern branch of the Erie tribe) with the Seneca to the east and the Ontario Iroquois to the west. Both type and attribute analyses of pottery vessels are used to assist in understanding these relationships. The presence of many non-local styles of pottery in early historic sites is noted and explanations offered.

Allen, Mark W (UCLA)

[511] PREHISTORIC FORTIFICATIONS IN NEW ZEALAND AND THE DEVELOPMENT OF THE MAORI CHIEFDOM.

Fortified settlements (*pa*) are key to understanding the development of Maori chiefdoms in late prehistoric New Zealand. This paper argues that increased need to protect populations, stored food supplies, and capital investments created the opportunity for elites to obtain greater power. *Pa* functioned as a means of protection for populations, but were also a focus for political and social activity. The model presented regards *pa* as appropriate indicators of polity identity and size, as well as the role of Maori leaders.

Allen, Melinda (Bishop Museum)

[307] ONE THOUSAND YEARS OF FISHING: SUBSISTENCE AND TECHNOLOGY ONAITUTAKI, COOK ISLANDS.

Over the last 1000 years, fishing strategies on the southern Cook Island of Aitutaki have undergone significant change. Early in the sequence there was an emphasis on angling technologies that gradually gave way to a predominance of netting strategies. This paper explores the process of change in terms of effective selective conditions and correspondent variation in local subsistence technology. Methodological considerations which limit archaeological interpretations are considered for the Aitutaki case. The evolutionary path of Aitutaki's prehistoric inhabitants is compared with adaptations in other Polynesian settings.

Allison, James R (Arizona State)

[210] CRAFT SPECIALIZATION AND EXCHANGE AMONG THE VIRGIN ANASAZI.

A large proportion of the culinary ceramics found on 11th century Anasazi sites in the Moapa Valley of Nevada were manufactured more than fifty miles to the east, in northwestern Arizona. This paper uses analyses of ceramics from sites in southeastern Nevada, northwestern Arizona, and southwestern Utah to more precisely define the regional distribution of these ceramics and to assess their degree of standardization in form and technology. Questions relating to the development of community specialization and interaction in egalitarian societies are—examined in light of these analyses.

Alonso, Angeles (see Lewenstein, Suzanne) [510]

Altschul, Jeffrey H (Statistical Research), Ronald H Towner (Arizona) & Steven D Shelley (Statistical Research)

[701] GIS MEASURES OF REGIONAL PRODUCTIVE POTENTIAL.

Measures of productive potential for the Tonjo Basin for the period AD 700-1450 are the focus of this paper. The methods for linking soils information, dendroclimatic data, plant yields, and

technological variability are discussed. The GIS approach is used to assess carrying capacity for the major time periods. The basin is then divided by period into catchment areas for major settlements, and productivity estimates are provided for each catchment. Variations in productive potential over time and space are examined in light of hypothesized changes in the complexity of the social system.

Ambrose, Stanley H (Illinois-Urbana-Champaign)

[211] STABLE ISOTOPE ANALYSIS OF PLEISTOCENE ARCHAEOFAUNAS FROM CENTRAL EUROPE.

Teeth and bones of non-human mammals from the open site of Milovice (Czechoslovakia, 26,000 BP) and Vindija Cave (Yugoslavia 80,000 BP) have well preserved collagen. Stable carbon and nitrogen isotope analysis of collagen provided results consistent with those on modern European mammal communities and late Upper Pleistocene archaeofaunas. Carnivores and herbivores can be distinguished with nitrogen isotopes. If Middle and Upper Paleolithic hominids in Europe also have well preserved collagen, it should be possible to use isotopic analysis to reconstruct their positions in their foodwebs.

Ames, Kenneth M (Portland State)

[113] SOUTHERN NORTHWEST COAST ELITE CONTROL OF THE HOUSEHOLD ECONOMY.

The economic roles of the Northwest Coast's chiefly elite are ethnographically well described for the 19th century, but there is little relevant archaeological data for the contact and pre-contact periods. Recent excavations of a large plank house dating between ca AD 1400-1800 in NW Oregon show clear differences between low and high status ends of the house in food processing, storage, and access to and use of exotic and native metals (iron and copper). These results suggest much stronger elite control of this household's economy than predicted from available ethnohistoric sources.

Amick, Daniel (Desert Research Institute)

[404] SNAKES AND LADDERS: TECHNOLOGICAL ORGANIZATION AND THE STRUCTURE OF INFERENCE IN LITHIC ANALYSIS.

The relationship between lithic data and technological organization is complex. While the theoretical aspects of technological organization have evolved substantially, consideration of the structure of inference in lithic technology remains underdeveloped. This paper uses Folsom assemblage case studies to argue that the linkage between lithic data and organizational theory requires a greater focus on behavior. The sequential nature of stone tool manufacture, use, and discard provides a unique dimension to behavioral reconstruction. In addition, behavioral inferences must be placed within the context of situational decisions in order to understand the conditions under which organizational strategies are responding.

Ammerman, Albert J (Colgate) [Discussant 108]

Anderson, David G (National Park Service)

[403] EXPLAINING CHANGE IN THE SOUTHEAST: EVALUATING EVOLUTIONARY

MODELS FROM THE MULTISCALAR PERSPECTIVE.

Diachronic examination of the southeastern Mississippian archaeological record has proceeded employing a number of scalar frameworks, including analyses at the intrasite, site, locality, regional, and interregional levels. Research employing multiple scales of analysis going beyond the site or locality level is comparatively infrequent, yet has proven to be remarkably productive in advancing and evaluating explanatory models for the emergence, expansion, interaction, and collapse of complex societies within the region. Examples of multiscale analyses employing archaeological, paleobiological, paleosubsistence, ethnohistorical, and ecological data are reviewed. The success of these approaches suggest profitable directions for future research.

Anderson, David G (see Milner, George R) [102]

Anderson, Jeff (Anderson Environmental Services)

[707] FIELD PARAMETERS USED TO RECOGNIZE RECENT HISTORICAL ALLUVIUM ON THE UPPER MISSISSIPPI RIVER VALLEY.

Federal agencies are responsible for locating and managing significant historic properties on their lands, a difficult task when natural and human-induced forces have masked or degraded cultural deposits and landforms. During the 1980s the Corps of Engineers contracted numerous archaeological investigations. Geomorphological assessments revealed that original (before ca 1830) pre-EuroAmerican settlement surfaces "native" soils were severely eroded in uplands or buried in valleys by recent historical alluvium. This paper describes field indicators used to distinguish historical deposits from native soils, and addresses implications for research design, site interpretation, and effective management.

Andrews, E W V (see Hamilton, Rachel J) [209]

Andrews, Susan (see Young, Amy L) [104]

Anthony, David (Hartwick)

[512] MODELING MIGRATION IN THE EASTERN WOODLANDS: THE RULES OF THE GAME.

Migration is not a chaotic or unstructured aspect of human behavior; on the contrary, migration operates in predictable and highly patterned ways. The prehistoric expansion of Algonquian-speakers in the Eastern Woodlands, a linguistically attested phenomenon that must have proceeded partially through migration, can be better understood if we apply a model of migration that can establish the parameters within which archaeologists and linguists should be working. The model, published earlier (AA'90), suggests some restraints on current theories of Algonquian expansion.

Anyon, Roger (Zuni Archaeology) [Discussant 304]

Anzalone, Ronald D (Advisory Council on Historic Preservation)

[101] WHY HAVE ARCHAEOLOGICAL STANDARDS?

American public archaeology is hard to explain to the "public" we allegedly serve. Since the federal/state system of oversight and review depends largely on consensus and consultation rather than absolutes, our expectations and guidelines to implement them are often so general and "flexible" that they become meaningless. Understandings of acceptable practice vary widely when applied to specific archaeological projects or programs. If this is true, why and for whom should we have archaeological standards, and at what level are they best developed and implemented to serve our often conflicting needs.

Aoyama, Kazuo (Instituto Hondureño de Antropología e Historia)

[209] MICROWEAR ANALYSIS WITHIN THE ARCHAEOLOGICAL CONTEXTS OF THE SOUTHEAST MAYA LOWLANDS.

The study of microwear, or use-wear, is an obvious starting point in the reconstruction of the history of lithic artifacts in Mayan life. Based on the results of 267 replicative experiments of obsidian and silicate conducted with a range of worked materials, use-wear patterns were classified using Keeley's high-power method. This paper describes the results of a microwear analysis of the Late Classic period lithic artifacts from Copán and Los Higos, Honduras, and shows how the functional data can be interpreted within the archaeological contexts.

Applegate, Alex (Southern Methodist)

[514] RECENT INVESTIGATIONS AT POT CREEK PUEBLO.

Archaeological investigations at Pot Creek Pueblo, near Taos, New Mexico, have been ongoing for the past three decades. Research is currently focused on the process of primary population aggregation at the pueblo during the 13th-14th centuries AD. This paper concentrates on recent intensive investigations of one of the roomblock units at the pueblo, and offers insights into the overall structure of this aggregated community.

Armelagos, George J (see Nelson, Ben A) [210]

Arnold, Jeanne E (UCLA)

[603] ORGANIZATIONAL TRANSFORMATIONS IN COMPLEX HUNTER-GATHERER EVOLUTION.

Complex hunter-gatherer developments often are treated as exceptional or unique and, therefore, are overlooked in models of the evolution of cultural complexity. A review of complex New World hunter-gatherer societies permits reanalysis of the organizational changes which underlie the emergence of chiefdom-like organization. Specific types of economic and political changes experienced by some hunter-gatherer groups, such as reorganization of labor in manufacturing, extraction, and construction activities, are identified in order to highlight how complex hunter-gatherers differ from simpler foraging societies and compare to agricultural chiefdoms.

Arnold, Philip (Loyola), Robert S Santley & Ronald R Kneebone (New Mexico)

[313] FORMATIVE PERIOD SETTLEMENT ORGANIZATION IN THE SIERRA DE LOS TUXTLAS, VERACRUZ, MEXICO.

The southern Gulf Coast of Mexico is a key region when discussing the development of Mesoamerican complex societies. Despite the acknowledged importance of this "heartland," regional Gulf Coast settlement information dating to the Preclassic is extremely rare. The first season's results of the Tuxtla Survey Project provided unexpected data on the density and diversity of Formative period

Gulf Coast occupation. This paper presents these settlement data and discusses their implications for sociopolitical development within this important area of Mesoamerica.

Arter, Susan R & Melinda Zeder (Smithsonian)

[609] ANIMAL UTILIZATION AT GORDION.

Analysis of the Gordion fauna has two primary goals: 1) to reconstruct changing patterns of animal exploitation over a 1500 year period, tracing relationships between animal exploitation, site function, and ecological setting, and 2) to see if animal bones can be used to identify material culture correlates of ethnicity. The 112,000 bone sample shows significant differences in the representation of species between chronological phases. Detailed study of other attributes is used to determine the factors that directed these differences.

Athens, J Stephen (International Archaeological Research) & Jerome V Ward (Auburn)

[307] VEGETATION CHANGE AND PREHISTORIC SETTLEMENT IN HAWAII.

The impact of Polynesian settlement on the flora of Hawai'i is examined using pollen data from a variety of lowland coring locations. Building on earlier findings of massive prehistoric lowland vegetation change following Polynesian settlement of Hawai'i, the concern of this study is primarily comparative. The different sampling locations throughout the Hawaiian Islands are examined for 1) the chronology of vegetation change, 2) the nature of both pre- and post-Polynesian contact vegetation communities, and 3) the rate of vegetation change. Such information can provide useful insights into the variability of Polynesian settlement and land use in regionally diverse lowland environments throughout the Hawaiian Islands.

Audouze, Francoise M (CNRS)

[103] A DYNAMIC APPROACH TO SPATIAL ANALYSIS.

Spatial analysis of the Magdalenian site of Verberie in northern France is based on a dynamic approach that takes into account the duration of human activities that created the site. Time is recreated through the reconstruction of the different technical "chaines operatoires" and the traces they leave on the living floors. Flint and bone refits are associated with experimental and ethnoarchaeological models to achieve this reconstruction. An improved version of unconstrained cluster analysis is used to create a context for these analyses.

Aument, Bruce W (Archaeological Services Consultants)

[302] VARIABILITY IN TWO MIDDLE WOODLAND HABITATION SITES FROM THE CENTRAL OHIO UPLANDS.

The hamlet model for Middle Woodland settlement/subsistence in central Ohio is based on survey data from the major river valleys. CRM related surveys in the past ten years have identified Middle Woodland sites in upland settings. Two habitation sites (33Fr895 and 33Fa81) situated along the divides between the Scioto River and neighboring drainages have been test excavated providing a body of comparative data. Overviews of site structure and artifact assemblages document the present range of variability in this site type and allow for an initial evaluation of the continued utility of the hamlet model.

Ayres, William S, Osamu Kataoka & Rufino Mauricio (Oregon)

[508] DIETARY AND SOCIAL CONTEXT OF PRESTIGE FISH, POHNPEI, MICRONESIA.

Fish remains form a significant portion of the food refuse found in archaeological sites on Pohnpei, Micronesia. They are used to reconstruct past dietary patterns and social status variations based on an ethnographic model; certain fish and mammals are used today in prestations to chiefs within the complex redistributive systems. Differential use of the historically identified prestige fish in archaeological sites is evident from this analysis, and quantification of these remains shows a pattern consistent with other measures—portable artifacts and stone architectural forms and sizes—used for defining site activities and functions within the Pohnpei chiefly political system.

Babson, David W (Illinois State)

[104] WESSYNGTON AND ASHLAND-BELLE HELENE: COMPARING SHERDS OF THE PLANTATION MONOLITH.

Wessyngton was a large, tobacco and stock plantation in western Tennessee. Ashland-Belle Helene was a large sugar plantation in southern Louisiana. Comparison of preliminary archaeological studies on these two very different plantations points out differences, and some similarities, between two varieties of what has too often been described as a single form of culture, geography, and economy.

Baenziger, Marsha S & Zhojun Zhao (Missouri-Columbia)

[501] CLUES IN THE SEARCH FOR THE MILLETS OF THE PAST: OPAL PHYTOLITHS AND HOW THEY MAY TELL THE STORY.

Identification of phytoliths from millets in prehistoric soils may further knowledge of the first domestication of these grain crops. To make this determination, phytoliths were extracted from

modern cultivated millets and related wild grasses, and criteria were developed for identifying these plants archaeologically. Our goal is to study all the millets; however, this study reports on only two species, common millet (*Panicum miliaceum*) and foxtail millet (*Setaria italica*). Preliminary results suggest that certain dumbbell-shaped phytoliths and trichomes are promising for distinguishing the taxa. Results of this research, and the potential and limitations for identifying millets through phytolith analysis, are discussed.

Baied, Carlos (see Santoro, Calogero) [305]

Baker, Jeffrey L (Arizona)

[411] THE INFLUENCE OF HOUSEHOLD DECISION MAKING STRATEGIES ON SETTLEMENT PATTERNS.

Most models that have been developed to explain differences in settlement densities (nucleated vs dispersed) have relied upon arguments concerning the political complexity of the cultures in question. These often include cultural biases that consider wet tropics as less suited for the development of complex societies than arid river valleys. A model is proposed to account for differences in settlement densities among several Mesoamerican sites. The model suggests that variation in settlement densities is the result of different risk reducing strategies that are adopted by households within diverse communities.

Baker, Joseph (Pennsylvania Bureau for Historic Preservation)

[410] CULTURAL RESOURCE MANAGEMENT ARCHAEOLOGY IN PENNSYLVANIA: SUCCESSES AND FAILURES.

This poster compares the results of two very large-scale CRM projects conducted in the Commonwealth during 1990 and 1991. The poster explores the role that agency attitudes play in the results of compliance archaeology projects, and the lessons those results can teach all of us. The presentation focuses on the quality and volume of data that have resulted from projects that were sponsored by two very different agencies.

Baker, Larry L (Daggett & Chenault)

[214] TESTING AND APPLICATION OF PORTABLE GLOBAL POSITIONING SYSTEMS IN CULTURAL RESOURCE MANAGEMENT ARCHAEOLOGY.

Trimble Navigation's Pathfinder Global Positioning System (GPS) is a highly portable device capable of precisely locating coordinates or a series of coordinates in remote and unmapped areas. The system employs transmitted signals from Department of Defense NAVSTAR satellites to triangulate any given point with considerable accuracy. Several applications for the equipment are tested in terms of general utility and effectiveness in cultural resource management archaeology. The applications involve both locational and cartographic uses. The discussions include description of the equipment, theoretical considerations, technical limitations, practical problems, and tested results.

Baker, Richard G & Mary K Whelan (Iowa)

[607] EASTERN IOWA PALEOENVIRONMENTS AND CULTURAL CHANGE: INTRODUCTION AND PALEOECOLOGICAL BACKGROUND.

This paper introduces the results of paleoecological and archaeological research at alluvial fans along the western side of the Mississippi Valley, southeastern Iowa. Paleoecological investigations established a clear record of vegetation change, from late Pleistocene spruce-larch forest, to deciduous forest, to dominance by grass and cheno-ams. Archaeological survey and excavations examined the impacts of changing ecological parameters on Archaic and Woodland groups. All alluvial fans surveyed contained small Woodland deposits on the surface, but one large fan, the Gast Farm site, contained substantial Middle and Late Woodland communities. Preliminary analyses suggest a pattern of post-Early Woodland nucleation from the surrounding region.

Baker, Thomas R (Garrow & Associates) & James B Petersen (Maine-Farmington)

[614] RESULTS OF DATA RECOVERY INVESTIGATIONS CONDUCTED AT THE SMITH (ME 69-14) AND SMITH'S LANDING (ME 69-16) SITES IN THE KENNEBEC DRAINAGE VALLEY OF WEST-CENTRAL MAINE.

Data recovery investigations conducted by the University of Maine at Farmington Archaeology Research Center at the Smith and Smith's Landing sites in the Kennebec River drainage in west-central Maine have resulted in the recovery of approximately 50,000 artifacts and ecofacts. The data encountered at the Smith site reveal repeated occupations during the Terminal Archaic period Susquehanna tradition (ca 1800-800 BC), while those recovered at the Smith's Landing site reveal repeated occupations from the Middle Archaic period forward (ca 5500 BC-AD 1000). These important data allow for more precise comparison and continued refinement of far northeastern North American chronology and cultural process.

Bamforth, Douglas (Colorado-Boulder) & Peter Bleed (Nebraska-Lincoln)

[404] RISK AND THE ORGANIZATION OF FLAKED STONE TOOL TECHNOLOGY.

Recent lithic analyses identify many factors which affect flaked stone technology, but lack a unified theory. This paper expands recent discussions of risk as the basis for such a theory. We begin by defining risk, emphasizing two distinct components of existing definitions: probabilities of problems occurring and the costs of such occurrences. Second, we argue that technological behavior can be seen as a means of reducing these probabilities in the face of unacceptable costs. Third, we consider how risk affects flaked stone technology along a continuum from raw material procurement through tool production and use. Finally, we illustrate our perspective with an archaeological example.

Bar-Yosef, Ofer (Harvard)

[506] ARCHAEOLOGICAL MARKERS FOR EMERGING SEDENTISM AT THE ORIGINS OF AGRICULTURE IN THE NEAR EAST.

This paper discusses how we can recognize, given the limitations imposed by the archaeological records, the season or seasons during which Near Eastern Epi-Paleolithic and Neolithic sites were occupied. Employing known and reconstructed distributions of resources and their annual and decadal fluctuations as a scale with which archaeo-botanical and archaeo-zoological remains are compared serves as a basis for reconstructing the seasons of habitation of selected sites. Identifying the settlement patterns practiced by hunter-gatherers and early farmers from about 15 k years to 5 k years BP enables us to suggest a series of alternative hypotheses for the emergence of farming and later of pastoral societies.

Barber, Michael (see Rogers, Anne) [412]

Bardsley, Sandy (British Columbia)

[706] INSCRIBED STONE THRONES: DEDICATIONS OF AUTHORITY.

At Copan a group of monuments exhibiting unusual juxtapositions of hieroglyphic and iconographic content provides clues to understanding the interrelated social, political, and religious functions of sculpture. Investigation reveals a distinction between conventional monuments emphasizing royal portraiture as validation of authority, and this innovative set of benches and altars focusing instead on supernatural setting as the source of power. Also evident is a shift from more common, public records of anniversary celebrations to the more private documentation of dedicatory rites. At Copan the rite of dedication eventually became the most significant declaration of right.

Barker, Graeme, Annie Grant (Leicester) & Tom Rasmussen (Manchester)

[108] FIELD SURVEY AND ETRUSCAN STATE FORMATION: THE TUSCANIA PROJECT.

The notion of an exotic origin for the Etruscan civilization, which developed in central Italy in the 8th century BC, has long been abandoned in favor of indigenous development. However, the dominance of cemetery studies in Italian Iron Age and Etruscan studies has resulted in a lack of understanding of the process of state formation in terms of transformations in regional settlement systems. The Tuscania Survey has addressed this problem, using different regional sampling methodologies to obtain important new information on the process of state formation in Etruria.

Barnett, James F Jr (Mississippi Department of Archives & History)

[406] EDUCATION FOR THE PUBLIC AT THE GRAND VILLAGE OF THE NATCHEZ INDIANS.

The Grand Village of the Natchez Indians is a National Historic Landmark site administered by the Mississippi Department of Archives and History. Since 1977, the museum has worked to increase the public's awareness of the Natchez Indians, their interaction with European explorers and colonists, and the tribe's predecessors. The most effective way to accomplish this task has been to develop separate educational programs for each school grade and encourage the participation of adult groups such as elderhostels.

Barnett, William (American Museum of Natural History)

[405] CERAMIC PRODUCTION IN THE SOCIOECONOMIC ORGANIZATION OF THE TIWANAKU PERIPHERY.

Despite various interpretations of the Tiwanaku culture, the nature and scope of Tiwanaku peripheral control and socioeconomic integration remain unknown. Ceramic production data can approach questions of the nature of Tiwanaku related economies outside the Titicaca Basin. Preliminary petrographic and SEM/EDS analyses of local and Tiwanaku style ceramics from the sites of Tiwanaku, Arani (Cochabamba), Moquegua (Peru), and San Pedro de Atacama (Chile) are used to identify patterns of mineralogy and texture that reflect production location and technological variability.

Barr, Kenneth (Corps of Engineers)

[707] GIS AND GEOMORPHOLOGICAL MODELING FOR ARCHAEOLOGICAL SITE MANAGEMENT ON THE UPPER MISSISSIPPI RIVER.

Results of 10 years of systematic archaeological surveys, testing, geomorphological landform modeling, and data recovery projects are presented for a 315-mile (63,000 acres) portion of the Upper Mississippi River managed by the Corps of Engineers. Portions of Wisconsin, Illinois, Iowa, and Missouri lie within this river corridor. Geographic Information System (GIS) database for resource management and impact evaluation is discussed, along with an evaluation of the utility of the landscape analysis approach (geomorphology) for research design, data analysis, cultural interpretation, and GIS database management.

Barreto, Cristiana (see Heckenberger, Michael) [510]

Baryshnikov, Gennady (see Hoffecker, John) [211]

Bass, Patricia Marie (Rice)

[303] A GENDERED SEARCH THROUGH SOME WEST TEXAS ROCK ART.

Most archaeologists studying rock art agree that the methodological studies of the content of this visual artifact require a more anthropological approach to extracting social information from these data. This paper employs a multi-model approach to interpret rock art located in west Texas. The models used include: a cognitive archaeology model developed in South Africa for hunter-gatherer research and adapted to interpret California rock art using ethnographically informed analogical models; a neuropsychological model suggesting certain entoptic images are experienced cross-culturally during altered states; and symbolic/semiotic models employed to illuminate visual patterns and repetitions. A deliberate focus is engaged in an effort to track gender content in the art.

Bauer, Brian S

[111] NEW DIRECTIONS IN THE STUDY OF THE CUZCO CEQUE SYSTEM.

The ceque system of Cuzco was composed of at least 328 shrines which were organized along 41 hypothetical lines (or ceques) that radiated out of the capital of the Inca. This paper documents the likely positions of eighty-five shrines and the probable projections of nine ceques in the southeast quarter of the Cuzco Valley. The orientations of these ceques are compared with predictions set forth in current models of the system. The findings suggest that the locations of the shrines and the projections of the ceques varied to a greater extent than is suggested in the literature.

Baugh, Timothy (see Bray, Tamara L) [202]

Bayham, Frank (see Szuter, Christine) [604]

Beach, Timothy (see Dunning, Nicholas) [407]

Beaubien, Harriet F (Smithsonian)

[105] RECOVERY AND CONSERVATION OF ORGANIC MATERIALS AT CERÉN.

Artifacts made from organic materials do not ordinarily survive burial in tropical locations. Surprisingly, at Cerén a wide variety of organic materials has been found, and in several different modes of preservation—either directly preserved, carbonized, or directly molded by surrounding materials. These "negatives" have presented the greatest preservation challenges. Examples are given which illustrate special recovery techniques, providing otherwise irretrievable technical information; several painted organic artifacts are featured. The critical importance of on-the-spot conservation for these fugitive materials is emphasized.

Beaudry-Corbett, Marilyn (UCLA)

[105] FROM ARTIFACT ASSEMBLAGE TO HOUSEHOLD INVENTORY: THE MATERIAL REMAINS OF THE CERÉN SITE.

The recovery situation at Cerén provides an opportunity to "refit" the various components of an archaeologically recovered artifact assemblage into household inventories. By studying these integrated inventories we can examine numerous aspects of the Cerén community as it was functioning at the time of its destruction. This paper focuses on several analyses: 1) household strategies related to sustenance—food storage, processing, preparation, etc; 2) residents' participation in production activities (food and craft items) as well as in religious rites; and 3) the spatial organization of domestic structures as "containers" for household commodities. Implications of the Cerén data for other archaeological situations are discussed.

Beauregard, Alan (SUNY-Binghamton)

[605] STRUCTURE, AGENCY, AND THE SUSQUEHANNOCKS: TRACKING SOCIAL DIFFERENTIATION AT THE SOUTHERN FRINGE OF IROQUOIA.

History and archaeology regard the Susquehannocks as an Iroquoian-speaking group that became politically and ethnically distinct from the precursors of the Five Nations Iroquois during the early

16th century. Archaeological endorsements of this interpretation primarily cite differences in ceramic technology and decorative style, but rarely consider social conditions and practices that contribute to the formation of ethnic identity. This presentation treats the emergence of ethnicity as practice, and explores the requirements for evaluating this proposition on archaeological and ethnohistoric data. The resulting model is briefly applied to Susquehannock archaeology and ethnohistory.

Beck, Colleen (see Pippin, Lonnie C) [702]

Beck, Lane (see Geselowitz, Michael) [509]

Becker, Marshall J (West Chester)

[108] THE FIRST COLONY IN ITALY, 775 BC: BIOLOGICAL EVIDENCE FOR MICROEVOLUTIONARY CHANGE.

By 775 BC Greek traders from Euboea had set up a post on the island of Ischia in the Bay of Naples, Italy. From this location, on the southern margin of the Etruscan realm, these enterprising merchants linked the rich metals production centers of central Italy with the spice and silk markets of the Orient. Microevolutionary changes in the skeletons of the inhabitants of this early outpost reveal clues to the social dynamics between Greeks and their native hosts as the settlement developed into a major Greek colony.

Bellantoni, Nicholas F (Connecticut State Museum of Natural History) & David A Poirier (Connecticut Historical Commission)

[705] CONNECTICUT'S PRESERVATION MECHANISMS FOR PROTECTION OF NATIVE AMERICAN AND COLONIAL BURIAL GROUNDS.

The Connecticut Historical Commission (SHPO) and the Office of State Archaeology have sought to overcome historical miscommunication and distrust between archaeologists and the state's Native American community. Recent state legislation has created the Native American Heritage Advisory Council to further facilitate Indian-archaeologist interaction concerning the sensitive issues of sacred sites and burials. The late 17th century Pequot Long Pond Burial Ground and the colonial Walton Family Cemetery site represent two recent case studies where emergency situations required the excavations of human remains in accordance with new state legislation.

Benco, Nancy L (George Washington)

[213] MANUFACTURE AND USE OF CERAMIC SICKLES IN ANCIENT MESOPOTAMIA.

Clay objects shaped like sickles are commonly found at emergent urban sites throughout southern Mesopotamia. Despite their ubiquity, they have received little concerted attention from archaeologists. This paper surveys the literature on clay sickles and presents a technological and spatial study of 1650 clay sickles from the Uruk Mound, Abu Salabikh, in southern Iraq. The study indicates that clay sickles were multipurpose tools used in activities related to agricultural and craft production; moreover, their distribution and use may have been restricted. The paper closes by discussing the conditions that may have led to their development and disappearance.

Bender, Barbara (University College-London)

[301] STONEHENGE - 2000 AD.

Stonehenge has always been a contested landscape. Different groups have always attempted to appropriate it, physically and symbolically. In the material record of prehistoric, the written record of historic, and the media coverage of contemporary times, the 'losers' are underrepresented and misrepresented. This paper attempts to contextualize—culturally, socially, politically—the contemporary cacophony of claims made on Stonehenge, the different ways in which the landscape is conceptualized and engaged with—by the English Heritage lobby, the tourist industry, archaeologists, New Agers, Free Festivals, Druids, not to mention the government, police force, and media.

Bender, Susan J (Skidmore) & Hetty Jo Brumbach (SUNY-Albany)

[605] MATERIAL MANIFESTATIONS OF ALGONQUIAN ETHNICITY: A CASE STUDY FROM THE UPPER HUDSON.

The nature and meaning of ethnicity and the contexts in which it is likely to have material expression are discussed. Although ceramics are frequently conceived of as reliable indicators of ethnic identity, archaeological and ethnographic data suggest that stylistic patterning may have widely varying meaning in different contexts. Using an archaeological example from the Upper Hudson Valley, we test the hypothesis that ceramics are not good indicators of Algonquian/Iroquoian differences. In this example, ethnicity appears to have been signalled more clearly through other material manifestations.

Benedict, James B (Center for Mountain Archaeology)

[305] HIGH-ALTITUDE CULTURAL ECOLOGY OF THE COLORADO FRONT RANGE.

Prehistoric human use of the Front Range alpine region was constrained by topography, climate, lack of good toolstone sources, and scarcity of edible plants. Large herbivores were a major attraction;

they were hunted on the tundra uplands using communal drive-and-ambush techniques that evolved during late Paleoindian time. Two seasonal transhumance systems brought people to the crest of the Front Range from winter base camps in the eastern foothills. One involved simple up-and-down seasonal migration, and the other a 300- to 400-km counter-clockwise "grand circuit."

Benfer, Robert A (Missouri-Columbia)

[610] LOGIC PROCESSING, A SOLUTION TO UNDERDETERMINATION OF ARCHAEOLOGICAL EXPLANATIONS.

Expert systems are applications developed from cognitive science contributions to artificial intelligence. Their use could correct a flaw found in archaeological explanations, that of underdetermination in hypotheses that purport to link ideas with empirical observations. Goal-seeking expert systems evaluate assumptions stated as rules or heuristics which relate items in the knowledge base. Construction of an expert system permits existing knowledge and theory to be logically processed toward the equivalent of point predictions. Bioarchaeological predictions are examined and found to be severely underdetermined. The process of establishing the expert system leads directly to suggesting relations or observations that are needed.

Benn, David W (Discussant 607)

Benson, Robin (Texas-Austin)

[208] EXCHANGE PATTERNS AND FUNCTIONAL DIVERSITY IN RESERVE PHASE SITES, WEST-CENTRAL NEW MEXICO.

The relationship between Devils Park and the WS Ranch Site during the Reserve phase in west-central New Mexico provides an example of how goods and information flow between larger aggregated sites and smaller sites, while differences between two excavated sites within Devils Park illustrate differing interaction patterns within a dispersed agricultural settlement. The distribution of ceramic types and the elemental composition of the types highlights exchange patterns, while the differences in architectural features and overall artifact assemblages point out possible functional diversity.

Bermann, Marc (Pittsburgh)

[405] THE SOUTHERN TIWANAKU MARGIN: A VIEW FROM ORURO.

Recent survey of previously uninvestigated areas in the department of Oruro has revealed Tiwanaku materials at a number of sites. The nature and distribution of these materials suggest that interaction between the Tiwanaku state and the indigenous population took a range of forms. The research raises new questions about the relationship between the Tiwanaku state and the indigenous Wankarani culture.

Bernaldo de Quiros, Frederico (see Cabrera, Victoria) [608]

Bernstein, David (SUNY-Stony Brook) (Discussant 709)

Bettinger, Robert L (UC-Davis)

[305] GREAT BASIN ALPINE ADAPTATIONS.

Seasonal villages used by families engaged in mixed plant and animal procurement have now been located at extreme elevations in three central and western Great Basin ranges. They were established late in time and replaced a pattern of restricted alpine land use centering on short-term hunting forays. Alpine villages or substantial change in alpine land use, however, are seemingly lacking in eastern Nevada, where surveys disclose a casual and relatively changeless pattern of mixed plant and animal procurement. The dichotomy parallels and helps explicate adaptive and cultural-historical contrasts previously noted between the eastern and western Great Basin.

Bettis, E Arthur (Iowa DNR) & Nurit Goldman (Michigan)

[607] LANDSCAPE EVOLUTION AND THE DISPOSITION OF THE ARCHAEOLOGICAL RECORD IN THE MISSISSIPPI VALLEY OF SOUTHEASTERN IOWA.

The Mississippi Valley in southeastern Iowa contains a mosaic of landforms and underlying sediments that record the last 12,000 years of landscape history. Regional and local patterns of landscape evolution have exerted a profound influence on the disposition of the archaeological record by controlling many environments contemporaneous with occupations, and passing the evidence of those occupations through a filter that preserves, alters, or destroys the record of the human past. A regional pattern of alluvial fan development has preserved a detailed record of Archaic occupation of the valley margin, while a local floodplain stratigraphic sequence permits correlations of occupations dating from the last 4500 years.

Bettison, Cynthia Ann (Western New Mexico Museum)

[110] THE DETERMINANTS OF SETTLEMENT PATTERNS AMONG PREHISTORIC AGRICULTURALISTS IN EAST CENTRAL ARIZONA.

The objective of this study is to understand the prehistoric settlement patterns of the Lower Zuni River Valley between AD 900 and 1540. To accomplish this objective, this study differs from tradi-

tional settlement pattern studies in that the past environment, exclusive of archaeological sites, is the point of reference for analysis. Past environmental conditions and change in the study area are reconstructed. Projected field area locations, sizes, and productivities are produced for each time period to test an explicit model of settlement location selection. The expected patterns generated by the model are compared with the observed prehistoric settlement distributions to determine the degree to which environmental conditions contributed to prehistoric settlement patterns in the study area.

Bevan, Bruce W (see McConnell, Brian) [108]

Bibb, Lisa (Southern Methodist)

[110] RESIDENTIAL UNIT SIZE AND COMPOSITION PRIOR TO NUCLEATION IN THE PREHISTORIC RIO GRANDE.

The prehistory of the northern Rio Grande is less understood when contrasted with other areas of the Southwest. While more is known about the large pueblos of the region, discussion of the basic residential units prior to aggregation is underrepresented in the literature. The purpose of this paper is to examine variation in household function, size, and spatial distribution across time in the region. This information from the northern Rio Grande is contrasted with prehistoric data from more intensively investigated areas in the northern Southwest, and patterning of residential unit size and composition is discussed in light of these larger regional trends.

Bicho, Nuno (Southern Methodist)

[311] TECHNOLOGICAL VARIABILITY DURING THE PLEISTOCENE/HOLOCENE BOUNDARY IN THE PORTUGUESE ESTREMADURA.

This study is focused on technological variability during the Tardí and Postglacial times (12,000 to 8500 BP) in the Rio Maior area (Portuguese Estremadura). The relationship between typology and technology, presently undefined for any European Upper Paleolithic group, is examined through a detailed study and reconstruction of reduction strategies. Also, "desired end products" are examined through the relationships between raw material selection, blank production, and tool blank selection. The results suggest that there are significant differences in technology during this period where factors such as water and raw material sources are not likely to account for the lithic diversity.

Binford, Lewis R (see Kuhn, Steven L) [103]

Black, M Jean (North Carolina-Chapel Hill)

[402] ETHNOGRAPHY AND PALEOETHNOBOTANY: SOME OBSERVATIONS ON A DOUBLE LIFE.

In recent years, ethnoarchaeology has received currency among professional archaeologists. This method of gaining insight into prehistory by means of ethnographic studies has been practiced by paleoethnobotanists even longer. Beginning with Melvin Gilmore and continuing to the present time, asking the experts—that is, native peoples—has had an impact on our thinking about plant utilization in the past. In this paper, I briefly discuss some aspects of ethnographic studies jointly undertaken by this author with Richard Yarnell in the Canadian subarctic over a 27 year period.

Blackman, M James (see Myers, J Emlen) [309]

Blair, Carl (Minnesota)

[311] THE PRODUCTION OF IRON IN LATE IRON AGE EUROPE.

The production of iron in the La Tene C and D periods of European prehistory was of great importance to the cultures of western and central Europe. Abundant artifactual evidence, including iron slags, ores, and the characteristic Burgenland style furnaces, provides a useful base for the study of the scale and organization of this iron production. However, until May 1991 no Burgenland furnace had been constructed and fired in a full production smelt. The results of the May 1991 production smelt provide significant corroborative data that allow for more detailed models of large-scale iron production to be suggested.

Bleed, Peter (Nebraska-Lincoln)

[404] RISK AND COST IN JAPANESE MICROCORE TECHNOLOGY.

At the end of the Pleistocene, mobile hunting groups throughout Japan used wedge-shaped cores to produce microblades. Techniques involved in making and using these cores have been reconstructed in minute detail, and their age and distribution are well documented. To address the role cores and microblades played in terminal Paleolithic economy, this paper uses event tree analysis to identify patterns of risk in the production of microblade cores at three terminal Japanese Paleolithic sites. This analysis amplifies typological descriptions of the cores and shows that microcore production clearly was carried out in the context of broader stone-use strategies. Microcores clearly were produced

in stages and at different sites. Their analysis therefore also illuminates broader patterns of cost management and mobility of the period.

Bleed, Peter (see Bamforth, Douglas) [404]

Bloom, Paul R (Minnesota) & Mary Pohl (Florida State)

[407] SOILS AND ANCIENT MAYA AGRICULTURE IN THE LOWLANDS OF NORTHERN BELIZE.

In the Karstic lowlands of northern Belize, the ancient Maya practiced both swidden cultivation as well as permanent cultivation in drained wetlands. The soils generally have a high fertility status compared to the highly weathered soils found in many tropical regions. Most of the soils are mollisols and incipitols with swelling clays that are residual from the weathering of the Karst. Some of the fine textured soils that became dry at the surface during the dry season exhibit some vertic activity and are difficult to cultivate. The soils tend to be high in potassium but low in phosphorus, and some are low in zinc and boron. Organic nitrogen, high in the wetland soils, and phosphorus were the limiting nutrients for ancient Maya agriculture.

Bludau, Cheri (Tucson Unified School District)

[106] WHY ARCHAEOLOGY IN THE CLASSROOM?

Teaching archaeology in the classroom benefits both the students and the teacher. It affords the opportunity to blend subjects across the curriculum under one theme. The school day no longer assumes the segmented regimen of individual unrelated subjects. Archaeology can take the students from their knowledge base of the present into an understanding of the people that survived in the past. Comparisons between their own culture and economic base and that of prehistoric populations can foster new understanding and growth, which can lead into a desire to preserve the past for the future.

Bludau, Cheri (see Ellick, Carol J) [106]

Bond, Clell L & Robert Gearhart (Espey, Huston & Associates)

[702] CALIFORNIA, OREGON, AND WASHINGTON ARCHAEOLOGICAL RESOURCE STUDY.

The Pacific OCS Region of MMS contracted with Espey, Huston & Associates, Inc, to conduct a study of the OCS between Morrow Bay, California, and the Canadian border. Overviews are presented and models are formulated to predict the areas in which prehistoric and historic archaeological sites are likely to be preserved on the OCS. Variables considered include late Pleistocene and Holocene geology of the OCS, known archaeological site distributions, prehistoric settlement patterns, vessel traffic patterns, and the distribution of significant hazardous weather conditions. The results of this study will be used in evaluating mineral development activities on the OCS and in determining remote-sensing survey requirements that will apply to specific areas of the OCS.

Bonde, Sheila (see Maines, Clark) [408]

Bonhage-Freund, Mary Theresa (Penn State)

[310] A PALEOETHNOBOTANICAL ANALYSIS OF FOUR UPLAND SITES IN NORTH CENTRAL GEORGIA.

Although Mississippian settlements are typically associated with riverine environments, over 300 "homestead" sites are known in the Piedmont uplands of the Oconee watershed in north central Georgia. Most of these sites date to the last two phases of the Lamar period, Dyar and Bell (AD 1520-1660), during which dramatic regional demographic growth has been postulated. Paleoethnobotanical analysis of four upland sites reveals a diachronic shift in plant exploitation strategy, from the targeting of a limited number of highly favored taxa, to the utilization of an extensive range of species. This pattern reflects increasing economic stress, supporting the hypothesized population expansion.

Borrero, Luis Alberto (Conicet)

[212] DUNG AND STRATIGRAPHY AT CUEVA DEL MYLODON, CHILE.

Cueva del Mylodon is a huge cave site located in southern Patagonia, Chile. Archaeological excavations have demonstrated short-term human occupations punctuated between 8000 and 2000 BP and a thick deposit of ground sloth (*Mylodon darwini*) dung, formed between 13,500 and 10,000 BP. The latter deposit covers an area of well over 400 square meters. A wide variety of cultural and natural formation processes were identified. Paleoenvironmental and cultural inferences are relevant for the understanding of the regional archaeology, focusing on the extinction of Pleistocene megafauna and the process of human colonization of cold habitats.

Bostwick, Todd (see Stone, Connie L) [604]

Bowen, Joanne (Colonial Williamsburg)

[606] A COMPARATIVE ANALYSIS OF THE COLONIAL NEW ENGLAND AND CHESAPEAKE HERDING SYSTEMS.

Colonial New England and Chesapeake agriculture are compared to show how colonists developed distinctive herding systems that ultimately affected primary uses for cattle. Analysis of documents and archaeological kill-off patterns show that in New England a system of well-developed fields and herd management practices produced cattle for both beef and dairy products. In contrast, agriculture in the Chesapeake focused on the cash crop tobacco. Cattle were left to fend for themselves on undeveloped lands, and when combined with the warm climate, the effect was that dairying remained unimportant.

Boyd, Cliff & Donna C Boyd (Radford)

[509] LATE WOODLAND MORTUARY VARIABILITY IN CENTRAL AND WESTERN VIRGINIA.

Much variability in the modes of human interment and kinds of associated grave goods has been noted in the Late Woodland (AD 800-1600) archaeological record of central and western Virginia. During this period, secondary interments in accretional burial mounds, primary inhumations in villages and cemeteries, and even interments in platform mounds are noted in different regions. Grave goods include exotic items, possibly indicating status differentiation. This variability in Virginia is summarized by region and is compared to mortuary patterns of nearby contemporaneous Mississippian cultures, such as Hiwassee Island, Dallas, and Pisgah.

Boyd, Donna C (see Kimball, Larry R) [310]

Boyd, Donna C (see Boyd, Cliff) [509]

Boyntner, Ran (UCLA)

[405] TERMINAL TIWANAKU TEXTILE STYLE IN THE COASTAL OSMORE VALLEY, SOUTHERN PERU.

The Tumilaca culture of the lower coastal Osmore Valley emerged with the decline of the Tiwanaku state. Examination of textiles from tombs of Algodonal has revealed a distinct local style. This style is defined on the basis of weaving technique, design motifs, design location, and color patterns. Stylistic comparison with textiles from elsewhere in Moquegua and the Peruvian and Chilean coasts provides a basis for evaluating interaction between Tiwanaku and the populations in these areas.

Bradley, Bruce & James Kleidon (Crow Canyon)

[514] PUBLIC ARCHITECTURE IN A PUEBLO III COMMUNITY: NEW INFORMATION FROM THE SAND CANYON LOCALITY, SOUTHWESTERN COLORADO.

Long-term research in the Sand Canyon locality in southwestern Colorado has investigated community organization including scale, differentiation, mobility, and integration. Integral to this study is the identification and interpretation of public spaces that may have served the community as a whole. Three such features have been identified at Sand Canyon Pueblo: a plaza; a central, D-shaped, bi-walled structure; and a great kiva. Initial excavations have shown that all of these structures are contemporary with the rest of the site. Labor investment and spatial analysis indicates that they probably were built by and served social groups larger than a household.

Bradley, James W (Phillips Academy-Peabody)

[1] ACCOMMODATING CHANGE: THE ONONDAGAIROQUOIS.

The Onondaga are notable, not only for their historic importance as the center of the Iroquois Confederacy, but as one of the few Native American cultural groups in eastern North America that continue to reside in their ancestral homeland. The archaeological and documentary records for the Onondaga are reviewed from late prehistoric through the early 17th century. Emphasis is placed on understanding why the Onondaga were able to survive, and on how we reconstruct the processes of cultural change and continuity.

Brady, James (see Houston, Stephen D) [610]

Brand, Uwe (see Rollins, Harold) [109]

Brashler, Janet G (Grand Valley State), Steve Kite (West Virginia) & Nicholas Friedin (Marshall)

[710] NEW PERSPECTIVES ON THE ST ALBANS SITE.

Threatened by riverbank erosion and vandalism, fieldwork was initiated at the St Albans site (46KA27) in the summer of 1991 to explore areas adjacent to the 1960s' excavations. Hand excavation of eight 3x3 m units and profiles at two locations along the streambank complemented a core drilling regime. Results of the work contribute to knowledge of the site and the Kanawha Valley in three

areas discussed in this paper: the geologic and sedimentary history of the site, the previously undocumented later prehistoric occupations, and attributes of late Pleistocene and early Holocene occupations in the area.

Bray, Tamara L, Timothy Baugh & Thomas W Killion (Smithsonian)

[202] HERITAGE AND OWNERSHIP: THE ISSUE OF COMPETING CLAIMS IN REPATRIATION.

Native American groups have been able to recapture some control over their own heritage through repatriation legislation. The complexities involved in the actual implementation of these laws are becoming apparent as specific cases unfold. At the Smithsonian, one problem that we have encountered repeatedly revolves around the issue of multiple or competing claims. This paper examines issues of ownership, the structure of competing claims, how disputes may be resolved, and the implications of repatriation decisions for tribal integrity.

Brenner, Mark (see Dahlin, Bruce H) [407]

Brenner, Mark (see Leyden, Barbara) [407]

Brenton, Barrett (Massachusetts-Amherst) & Alan J Osborn (National Park Service)

[210] FOOD STORAGE BEHAVIOR: ARCHAEOLOGICAL AND ETHNOGRAPHIC CASES FROM THE COLORADO PLATEAU.

Food storage behavior can only be understood in the multiple contexts of seasonality, nutritional needs, food processing, mobility, social organization, and architectural design. Our paper highlights the need to integrate these contexts to further an understanding of human adaptation to arid environments in both the past and present. We discuss the biocultural evolution of storage areas through time on the Colorado Plateau. Finally, we make recommendations for recognizing and interpreting the variability of storage facilities in the prehistoric Southwest.

Bricker, Harvey M (Tulane)

[103] SPATIAL PATTERN AND STRUCTURE OF CHATELPERRONIAN OCCUPATIONS AT LES TAMBOURETS (HAUTE-GARONNE, FRANCE).

At the open air Chatelperronian site of Les Tambourets, attempts to understand spatial patterns and structure have concentrated on the study of lithic artifacts, the only class of occupational debris preserved. Various techniques for recognizing and defining clusters were employed. Although the archaeological horizon was rather thin (c. 8 cm), three-dimensional solutions that attempted to "unpeel" the stratigraphically undifferentiable palimpsests were clearly more informative than two-dimensional clustering approaches.

Bridges, Sarah T (US Fish & Wildlife Service) [Workshop 401]

Britton, James (see Tamplin, Morgan) [410]

Brook, Richard & Mary Tisdale (BLM)

[112] CAN A FEDERAL AGENCY EDUCATE THE PUBLIC ABOUT ITS HERITAGE?

Is cultural resource education really the cure-all for the long-term preservation of the nation's cultural heritage? Can cultural resource managers demonstrate the benefits to the public, the profession, and their own agencies of heritage education when the results are so remote and conjectural? These questions are examined from several perspectives. They also are considered in light of the Bureau of Land Management's own decision to focus its national flagship education program on cultural resource education to help combat the growing crisis in American education. Suggestions for providing educational opportunities for young people, while meeting internal cultural resource management objectives are also discussed.

Brose, David S (Cleveland Museum of Natural History)

[1] PENUMBRAL PROTOHISTORY ON THE NORTH COAST.

Aboriginal societies along the central lowland and Appalachian edge portions of northern Ohio displayed markedly differing Late Woodland cultural trajectories. Between AD 1200 and 1300, Mississippian influences from the Ohio Valley, carried north to the Maumee River thence east along Lake Erie, transformed local groups. By AD 1450 northeastern Ohio groups, pressed against western Iroquois by expansion of their western neighbors, adopted defensive settlement and economic systems. Between AD 1550 and 1650, local retrenchment was followed by regional abandonment.

Brose, David S (see Pratt, G Michael) [204]

Browman, David L (Washington-St Louis) [Discussant 405]

Brown, Ian W & Richard S Fuller (Alabama Museum of Natural History)

[310] RECENT ARCHAEOLOGICAL INVESTIGATIONS AT BOTTLE CREEK (1BA2), A MISSISSIPPIAN MOUND CENTER IN THE MOBILE-TENSAW DELTA OF SOUTHWEST ALABAMA.

Bottle Creek (1Ba2) is the largest mound site on the US Gulf Coast. In Alabama it is second only to Moundville in size and significance. Yet this important Mississippian site has received minimal attention from archaeologists since David DeJarnette's excavations in 1932. In the summer of 1991, the Alabama Museum of Natural History conducted controlled surface collections across the site plus test excavations in one of the mounds. Analyses of recovered artifacts and their distributions have yielded information on 1Ba2 culture history and intrasite settlement and functional variability. The investigations also revealed a microlithic industry previously unreported for the region.

Brown, James A (Northwestern) [Discussant 204]

Brown, James A (see Sasso, Robert F) [102]

Brown, Jane L (see Rogers, Anne) [412]

Brown, Marley R III (see Samford, Patricia M) [606]

Brumbach, Hetty Jo (see Bender, Susan J) [605]

Brumfiel, Elizabeth M (Albion) [Discussant 507]

Bullock, Peter (Museum of New Mexico)

[113] ARE MACAWS VALID INDICATORS OF SOUTHWESTERN REGIONAL TRADE?

Prehistoric macaw remains recovered from sites across the Southwest have been considered proof of direct southwestern-Mesoamerican trade, based on their identification as native to southern Mexico. A review of the identification methodology indicates macaws cannot—be identified on a species level by skeletal remains alone. How does this affect our concepts of southwestern regional trade? The known volume of macaw trade does not support the concept of a "Greater Southwest" trading area. It is possible that direct southwestern-Mesoamerican exchange did not occur. The possibility of a native macaw population within the American Southwest also is discussed.

Burgess, Shelly (Chicago)

[405] HEALTH AT ALGODONAL: A PRELIMINARY REPORT.

From the terminal Tiwanaku cemetery of Algodonal in the lower Osmore Valley, 75 skeletons were examined for pathology and indicators of health stress. Incidence of trauma, orbita orbitalis, and porotic hyperostosis is compared to that of skeletons from the later Chiribaya population, allowing interpretation of changing lifeways within the valley during the transition from the Middle Horizon to the Late Intermediate.

Burke, Ariane (New York)

[211] SPATIAL ORGANIZATION AND INDICATORS OF SEASONALITY IN THE FRENCH UPPER PALEOLITHIC.

This paper examines current models of hunter/gatherer settlement organization for the Upper Paleolithic in southwestern France. Skelettochronological data and other seasonal indicators from a regional sample of Pleniglacial sites in the Aquitaine Basin are used to assess the validity of proposed models in this region. The mobility of human populations is examined relative to the seasonal movements of important prey species such as *Rangifer tarandus* and *Equus caballus*. Human hunting strategies are examined relative to the known ethology of the principal prey.

Burroni, Daniela B (see Donahue, Randolph E) [311]

Burton, James (see Price, T Douglas) [210]

Burton, Jeffery F (National Park Service)

[110] DATING ADAMANA BROWN WARE: IMPLICATIONS FOR THE ARCHAIC TO BASKETMAKER TRANSITION IN NORTHEASTERN ARIZONA.

The pivotal transition from the nomadic lifestyle of Archaic hunters and gatherers to the sedentary village life of the early agriculturalists has engendered fertile models of culture change. These models invoke causes such as population expansion, technological innovation or borrowing, and social interaction, and suggest gradual or abrupt, linear or punctuated processes. But the substantiation or refinement of these models requires fine-grained spatial information and precise chronometric data. Recent research at three Basketmaker II sites, including the first chronometric determinations for Adamana Brown ware, considered the earliest pottery on the Colorado Plateau, provides a local perspective on these global issues.

Butler, Virginia L (Colorado-Boulder)

[307] HERBIVORE VS CARNIVORE FISH CAPTURE: THE CASE FOR VARIATION IN LAPITA FISHING STRATEGIES.

Most arguments regarding fish use by Lapita peoples of the southwest Pacific rely on limited direct evidence from fish remains. Comparison of fish assemblages from Lapita contexts in the Mussau Islands, Papua New Guinea, with other assemblages from Melanesia and western Polynesia reveals significant variability in taxonomic representation. Some assemblages are dominated by herbivores (scarids, acanthurids), while others are dominated by remains of carnivorous fishes (e.g., lethrinids, serranids). Although differences in analytic and archaeological recovery practices, as well as natural abundances, may explain some of this variation, differences in capture techniques used (netting/hook and line) better explain the taxonomic variation.

Butterworth, Kolleen R (Ohio DOT)

[409] A VIDEO OVERVIEW OF THE EAST LIVERPOOL URBAN ARCHAEOLOGY PROJECT.

Using funding provided by the Ohio Department of Transportation, four different archaeological contracting firms were given the unique opportunity to participate in an urban archaeology project in East Liverpool, Ohio. This project involved the excavation of two pottery manufacturing areas and three residential areas related to the pottery industry in East Liverpool. Of special interest are the residential areas which cross cut social and economic bounds. Using the medium of videotape, a general overview of the project is presented. Each of the individual target areas within the project area is reviewed and the research goals outlined.

Byland, Bruce E (Lehman) & John M D Pohl (UCLA)

[306] TILANTONGO AND TUTUTEPEC: POSTCLASSIC RELATIONS BETWEEN THE MIXTECA ALTA AND COSTA.

Various indigenous and colonial documentary sources mention political and economic interaction between communities of the Mixteca Alta and Costa. Such anecdotal evidence does little to inform us as to how and why relations were maintained between relatively small communities over such distances. In this paper we attempt to derive an anthropological model of political and social organization which can account for documentary evidence of long distance interaction in the Mixteca. This model is used to make predictions about archaeologically discoverable evidence of interaction which can be sought in future exploration of Postclassic Costa and Alta regions.

Cabrera, Victoria (Universidad Nacional de Educación a Distancia) & Frederico Bernaldo de Quiros (Universidad de León)

[608] LITHIC MANAGEMENT DURING THE EARLY UPPER PALEOLITHIC IN CANTABRIAN SPAIN.

This paper compares the use of lithic materials in the Early Aurignacian of Castillo Cave with that at other sites excavated with modern controls such as Chufin (Solutrean) and Altamira (Lower Cantabrian Magdalenian). Special references are made to the use of flint and quartzite.

Caesar, Margaret D (see Lundberg, Emily R) [503]

Calabrese, F A & Ruthann Knudson (National Park Service)

[702] PUBLIC PROJECT ARCHAEOLOGY: MAINTAINING A RESEARCH ORIENTATION.

Many academically based scholars consider archaeology associated with public land use compliance as "place oriented" and restricted to management rather than ultimately directed to quality research. Any divorce of research from cultural resource management is not a reflection of laws and regulations, but of the attitude of archaeologists advising land managers and participating in public archaeology program implementation. Many public archaeology programs have made significant contributions both to archaeology as a science and to our understanding of North American paleoenvironments, prehistory, and history.

Callaghan, Richard T & Donna Fremont (Calgary)

[415] A COMPUTER SIMULATION OF ROUTES OF PASSAGE IN THE CARIBBEAN AND GULF OF MEXICO.

This computer simulation analyzes the difficulty of travel between the mainland and the Caribbean with indigenous watercraft. The environmental factors considered are the winds, currents, gale and hurricane frequencies, and swell conditions. The performances of watercraft from Central and South America are examined under these environmental conditions in the Gulf and Caribbean region. The performance data were collected for actual watercraft in Central and South America. Both accidental drift and intentional voyaging are examined. Drift routes from the mainland to the islands are ranked by the probability of crew survival. Intentional voyages are ranked by navigational difficulties.

*Cameron, Catherine M (School of American Research)***[110] PROCESSES OF SITE GROWTH AT SOUTHWESTERN PUEBLOS.**

Dean's (1969, 1970) classic study of Tsegi phase sites in northern Arizona demonstrated the value of site growth studies for understanding social processes at archaeological sites. Unfortunately, few sites have the remarkable temporal control that Dean relied on at Kiet Siel and Betatakin. This paper compares a recent study of architectural history at the Hopi pueblo of Oraibi with architectural processes at 14th-century Arroyo Hondo Pueblo in the northern Rio Grande Valley. Patterns of site growth, abandonment, and reoccupation at Arroyo Hondo may be partially explained by social patterns that caused architectural change at Oraibi.

*Campana, Douglas V (New York)***[608] TRENDS IN UPPER PALEOLITHIC AND EPI-PALEOLITHIC BONE TECHNOLOGY IN THE SOUTHERN LEVANT.**

Levantine Aurignacian assemblages include only a small number of bone implements of very few types, most of which seem related to the hunting of sizeable game. With the arrival of the Natufian the number and diversity of bone implements increased dramatically. Much smaller barbed bone points, implying smaller game, replaced the Aurignacian types, and many craft related bone implements appeared. The working of antler and bone primarily with flint tools, however, remained a consistent tradition. During the Natufian abrasive techniques of bone working were largely confined to decorative objects; abrasive techniques only became general in the late pre-pottery Neolithic.

*Canaday, Timothy (Washington)***[305] ARCHAEOLOGY AT ALTITUDE: PREHISTORIC HUNTING PATTERNS IN THE TOYABE RANGE, NEVADA.**

High altitude archaeology in the Great Basin has focused on developing models to explain the advent of alpine villages at about AD 800. These models have at least one thing in common—a shift from alpine logistic hunting to alpine villages. To date, however, very little attention has been paid to alpine hunting patterns. Instead, the villages have been the focus. This paper attempts to rectify this situation by examining Great Basin alpine logistic hunting patterns. Current research in the alpine zone of the Toyabe Range is evaluated in light of models suggesting a shift in late prehistoric alpine land use.

*Cande, Kathleen (Arkansas Archaeological Survey)***[310] AN ANALYSIS OF THE 1934 DELLINGER COLLECTION FROM CRADDOCK BLUFFSHELTER, ARKANSAS.**

In 1934, Samuel C Dellinger and Wayne A Henbest of the University of Arkansas Museum conducted excavations at three dry bluffshelters in the Boston Mountain subdivision of the Arkansas Ozarks, Crawford County, Arkansas. They recovered a substantial collection of perishable artifacts including basketry, cordage, arrow shafts, and floral remains, as well as chipped and ground stone tools and pottery. In conjunction with test excavations in shelter one, and in advance of planned highway construction, the Arkansas Highway and Transportation Department funded analysis of the 1934 Dellinger collection. This funding provided a unique opportunity to examine a valuable museum collection.

*Cannon, William J (BLM) [Workshop 401]**Capone, Patricia (Harvard)***[514] CERAMIC PETROGRAPHY OF SALINAS, NEW MEXICO, AND PROTOHISTORIC PUEBLO INTERACTION NETWORKS.**

This petrographic study of protohistoric ceramics from the Salinas area of New Mexico sheds new light on previously characterized sherds, and forms the basis for examining the effects of Spanish missionization on indigenous pueblo interaction networks at Abó Pueblo. Reexamination of numerous sherds, following previous characterization by A H Warren, along with examinations of previously unstudied sherds are presented. These preliminary data from Abó, which include data on ceramic micromass and inclusions as well as data from geological raw materials, begin an in-depth look at protohistoric ceramic trade and production in the Salinas area.

*Carambelas, Kristopher R & Robert G Elston (Intermountain Research)***[711] BETWEEN A ROCK AND A HARD CLAY: OPALITE EXTRACTION FROM SUBSURFACE DEPOSITS AT THE TOSAWIHI QUARRIES, NORTHERN NEVADA.**

This paper explores the relationship between the geological context of a lithic resource and human decision making in toolstone extraction. Data collected from Locality 36 of the Tosawihi Quarries suggest that the geomorphological setting of a lithic resource influences the initial placement of quarry workings, and that geological features of the resource influence the extent to which a particular

working is exploited. We propose that variation in extraction methods observed at Locality 36 is best explained by a least-cost/rate-maximizing approach to toolstone procurement.

*Carballo Marina, Flavia (see Franco, Nora Viviana) [212]**Carlisle, Ronald C (Michael Baker Jr) [Discussant 504]**Carlisle, Ronald C (Michael Baker Jr), Barbara J Gundy & Deborah Casselberry (Pittsburgh)***[409] EXCAVATIONS AT THE MANSION POTTERY, A 19TH CENTURY YELLOW EARTHENWARE POTTERY IN EAST LIVERPOOL, OHIO.**

Excavations at the Mansion Pottery (1842-1914) in East Liverpool, Ohio, identified the bases of the two original bottle kilns and recovered an extensive collection of yellow Rockingham-glazed earthenwares. The Mansion Pottery is one of only two potteries that have been excavated in East Liverpool, a city that once turned out half of all US ceramics. The excavations and attendant research afford an opportunity to explore 19th-century ceramic technology, site layout and architecture, labor utilization, ceramic decorative techniques, and production repertoire. The resultant data base forms an important contribution to the study of the industrial transformation of 19th-century North America.

*Carmean, Kelli (UC-Berkeley)***[113] NEW INVESTIGATIONS IN THE CAPE REGION OF BAJA CALIFORNIA.**

Fieldwork undertaken in the fall of 1991 in the Cape Region of Baja California is described within the context of previous excavations by Massey on the "Las Palmas" burial caves in the 1940s. Preliminary results are presented for regional site survey and test excavations. Overall research design is discussed, as is the application of new dating methods (subvarnish radiocarbon) in an area lacking good prospects for temporal control.

*Carnett, Carol (Legal Aid Bureau of Maryland) & Ray A Williamson (Office of Technology Assessment)***[112] SITE PROTECTION AND 'REVERSE ARCHAEOLOGY' IN THE GRAND GULCH, UTAH.**

Detailed provenience information for Basketmaker artifacts taken from SE Utah nearly 100 years ago is now available for the first time through the recent efforts of the Wetherill Grand Gulch Project. The project team has traced the location of numerous dry alcoves in SE Utah, most of which are on public lands, and uncovered historic records documenting the artifacts dug there. This paper briefly describes the project's major accomplishments and suggests methods by which federal and state land managers, working with private citizens, could provide more effective protection of these unique cultural resources.

*Carr, Kurt W (Bureau for Historic Preservation) [Introduction 601]**Carr, Philip (Tennessee)***[404] TECHNOLOGICAL ORGANIZATION AND PREHISTORIC HUNTER-GATHERER MOBILITY: EXAMINATION OF THE HAYES SITE (40ML139).**

Studies of prehistoric hunter-gatherer mobility have benefitted from using an organizational approach to technology. However, simple correlations between technological strategies (curated, expedient) and mobility strategies (collector, forager) are unwarranted. An interpretive framework based on organizational concepts is developed in order to understand the Middle and Late Archaic occupation of the Hayes Site (40ML139). The relationship between technological and mobility strategies is considered, as is the specific raw material distribution in the region. It is concluded that the site was used as a forager residence during the Middle Archaic and as both a collector and forager residence during the Late Archaic.

*Casselberry, Deborah (see Carlisle, Ronald C) [409]**Cassell, Mark S (SUNY-Binghamton)***[513] ESKIMOS, COMMERCIAL WHALING, AND THE CAPITALIST LABOR PROCESS IN LATE 19TH/EARLY 20TH CENTURY NORTH ALASKA: AN ARCHAEOLOGY OF KELLY'S WHALING STATION, 1891-1892.**

John Kelly established his commercial shore whaling station and hired 80 eskimo employees in 1891-1892, within five years of the initial use of Eskimos as wage laborers in the western Arctic commercial whaling industry. In the course of those five years Yankee whaler/traders combined their moral and material resources with those of Christian and federal interests to undermine traditional Eskimo social relations of production and gain control over the labor of virtually every Eskimo in north Alaska. The present paper links archaeological data from Kelly's whaling station with documentary data to understand the sociomaterial circumstances of the creation of an Eskimo industrial labor force.

Cederstrom, Thoric (see Haley, Harold) [411]

Chadderdon, Thomas J (Arizona State)

[311] CERAMIC CRUCIBLES AND TIN SMELTING AT GOLTEPE, A 3RD MILLENNIUM SITE IN CENTRAL TURKEY.

Among the artifacts recovered during the 1990 and 1991 field seasons at Goltepe are hundreds of fragments of ceramic crucibles. These crucibles are thought to have been used in the smelting process which extracted tin metal from cassiterite ore. This paper presents typological data on the crucibles, as well as the results of elemental analysis on the deposits left by the material processed in them.

Chapdelaine, Claude (Montreal)

[605] PROBLEMS ARISING FROM THE IROQUOIAN PRESENCE IN THE SAINT LAWRENCE ESTUARY.

During the Late Woodland period, the Iroquoians living in the Quebec City area developed a distinctive adaptive pattern combining horticulture and the exploitation of marine-based resources. Long-distance movements of large segments of communities in the Saint Lawrence Estuary are unique among Iroquoians. What criteria, then, can identify these northern farmers who evolved alongside Algonquian groups, while they were hunting seals and whales at the periphery of their homeland? We consider the implications of the *in situ* development theory for these Iroquoians, using ethnohistorical analogy, settlement patterns, ceramic attributes, lithic sourcing, mollusk exploitation, and NAA of clays and lithics.

Chapman, Jefferson (Frank H McClung Museum) [Discussant 402]

Chapman, Robert W (Reading)

[603] PROBLEMS OF SCALE IN THE EMERGENCE OF COMPLEXITY.

One of the characteristics of emerging complexity documented in both the ethnographic and archaeological records is the increased scale of sociopolitical units, both in terms of demography and spatial extent. This gives rise to the question as to how far, and under what circumstances, increases of scale were causes or consequences of emerging complexity. In turn, this directs attention to the preoccupation of archaeologists with system-wide variables at both micro-(households, communities) and macro-(regions, polities) scales. This paper considers problems of scale using archaeological data from prehistoric Europe.

Charles, Douglas K (Wesleyan)

[414] PROCESS AND STRUCTURE IN AMERICAN ARCHAEOLOGY.

The histories of modern historical disciplines can be framed within interacting polarities emanating from Enlightenment vs Romantic modes of thought. In American archaeology, these oppositions have often been articulated as emphases on the process of change or on synchronic interconnections. For example, Willey and Sabloff's classification of American archaeology reflects alternating ascendancies of processual and structural research strategies. The difference between Taylor's conjunctive approach and the New Archaeology, as well as the post-processual critique of the latter, conform to this pattern. This paper briefly explores American archaeology's past, present, and future in terms of the process/structure dyad.

Chase-Dunn, Christopher (Johns Hopkins), S Edward Clewett & Elaine Sundahl (Shasta)

[107] A VERY SMALL WORLD-SYSTEM IN NORTHERN CALIFORNIA: THE WINTU AND THEIR NEIGHBORS.

This paper examines late prehistoric local and regional interaction networks in northern California. What role did intervillage, intertribelet, and interlinguistic group relations play in social reproduction and change? How important were warfare, trade, intermarriage, and communications for local group structures? Were there incipient inter-regional (core/periphery) hierarchies in formation, and how were these related to processes of incipient class formation? The Wintu linguistic group's relations with Hokan speakers (Okwanuchu, Achomawi, and Yana) are the main focus of research. Archaeological and ethnographic evidence is used to investigate the geography and sociology of intergroup relations in this small world-system.

Chase-Dunn, Christopher (see Hall, Thomas D) [206]

Chazan, Michael (Yale)

[308] POTS AND PANS AT THE PYRAMIDS: POTTERY ANALYSIS AT GIZA.

The excavations at the Giza Plateau Mapping Project have produced a substantial corpus of Old Kingdom ceramics from secure stratigraphic features. Analysis has focused on defining the variables in ceramic production at Giza within this corpus. Other questions addressed are the economy of and technology of ceramic production at Giza, functional analysis of vessel types, and the relation of the

ceramic corpus from Giza with other collections from Egypt and with the descriptions of vessels in the scenes of daily life found in tombs in Giza and Saqqara.

Cheek, Charles D & Donna J Seifert (John Milner Associates)

[606] FANNY HILL AND MARY McNAMARA: HOUSEHOLD TYPES AND NEIGHBORHOOD IN 19TH CENTURY WASHINGTON, DC.

Archaeological investigations at Federal Triangle included the excavation of ten city lots in a working-class neighborhood in downtown Washington, DC. Archaeological and sociological research has demonstrated that distinctive combinations of three variables—socioeconomic status, ethnicity, and household composition—characterize neighborhoods. These three variables affect the consumption patterns of the neighborhoods. This paper focuses on the definition of household types in the neighborhood and the effect of household composition on artifact assemblages.

Chiago, Clarence M (see Ravesloot, John C) [202]

Childs, S Terry (Florida)

[708] SOCIAL DIFFERENTIATION AND COPPER IN SOUTHEASTERN ZAIRE.

Typological and frequency studies of grave goods from the burials at five cemeteries in southeastern Zaire indicate that social stratification and differentiation of individuals existed during the last millennium. In contrast, the social relations between the communities of people represented by those buried at each cemetery are little known. One avenue towards understanding group relations is to study the importation patterns of a shared valuable good. The paper focuses on the copper imported from the south and uses chemical analyses to consider the degree to which different sources of copper were used by the five communities and why.

Chilton, Elizabeth (Massachusetts-Amherst)

[309] NEW LIGHT FROM OLD LEGACIES: INSIGHTS INTO CERAMIC VARIATION AT THE GOAT ISLAND ROCKSHELTER.

Major syntheses of Hudson Valley prehistory have ignored archaeological sites investigated by Mary Butler as part of the Hudson Valley Archaeological Survey (1939-1940). A careful evaluation of one of the 45 sites tested by Butler, the Goat Island Rockshelter (Dutchess County, New York), demonstrates the importance of analyzing previously excavated collections. The rockshelter was used sporadically over the past 6000 years, with the most substantial occupation during the Middle Woodland (2000-1000 BP). By employing a detailed materials analysis, focusing on ceramic attributes and a minimum vessel count, this study challenges the efficacy of regional ceramic typologies.

Chippindale, Christopher (Cambridge)

[303] DIRECT DATING OF ROCK ART: WHERE IT'S AT AND WHERE IT'S GOING.

New studies, mostly dependent on radiocarbon, are making rapid progress in direct-dating of rock art. In each case, one may ask: just what is the material being dated? just where does the carbon come from? just what is the relation between the dated material and the act of making the picture? so as to know just what the date represents.

Chisholm, Brian S & R G Matson (British Columbia)

[205] ISOTOPIC EVIDENCE ON BASKETMAKER II DIET AT CEDAR MESA, UTAH.

Since the early 1900s various estimates have been made about the use of maize in Anasazi diet. Stable isotope analysis of bone gelatin from eight humans, recovered from the Cedar Mesa area, indicates that both Basketmaker II and Pueblo people in that area obtained about 79%, or more, of their protein from C4 plants, suggesting that maize was extremely important in their diet. The Pueblo people appear to have used perhaps 5% more C4 species than Basketmaker II people. Both were approximately 40 to 60% higher than the C4 plant intake of an Archaic individual from the same area.

Church, Flora (Archaeological Services Consultants)

[302] BEYOND THE SCIOTO VALLEY: MIDDLE WOODLAND OCCUPATION ON THE SALT CREEK DRAINAGE.

The record of Middle Woodland occupation in Ohio is not confined to major river valleys like the Scioto Valley. Peripheral drainages like Salt Creek have provided substantial evidence of occupation throughout the Early and Middle Woodland periods. An examination of the Salt Creek drainage, centered on the mitigation of 33Vi315—a Middle Woodland occupation in Vinton County—integrates data on subsistence, community structure, and relationship to mounds and earthworks in the vicinity to test Pruner's settlement model.

Church, Flora (see Nass, John P Jr) [204]

Cinquino, Michael (SHPO-Puerto Rico)

[415] EVALUATION OF 500 RECONNAISSANCE SURVEYS CONDUCTED ON THE ISLANDS OF PUERTO RICO, VIEQUES, CULEBRA AND MONA: ASSESSING FIELD METHODS AND EFFECTIVENESS OF THE FEDERAL CULTURAL RESOURCE PROGRAM.

Archaeological reconnaissance surveys of four Caribbean islands—Puerto Rico, Vieques, Culebra, and Mona—are evaluated for the adequacy of field methods, effectiveness of subsurface testing and surface investigation, intensity of area surveyed, the number of archaeological sites discovered, and the effectiveness of individual archaeologists in documenting sites. The sample includes 500 reports covering over 25,000 acres and 500 kilometers of surveyed area. A further issue addressed is the success of over ten years of commercial archaeology and effectiveness of cultural resource legislation in protecting archaeological resources.

Ciolek-Torrello, Richard S (Statistical Research), Karen R Adams (Crow Canyon) & Jeffrey A Homburg (Statistical Research)
[701] ARCHAEOLOGICAL APPROACHES TO FOOD PRODUCTION AND PLANT EXPLOITATION.

The prehistoric population of the Tonto Basin developed an intricate subsistence system involving intensive farming and the exploitation of a variety of desert plants. Several approaches are used to gain a better understanding of this system. Modern distribution of usable plants is mapped using vegetation survey techniques, and the prehistoric distribution of cultivars and wild plant resources is reconstructed from flotation, pollen, and phytolith analyses of samples from archaeological contexts. These data are integrated with a series of physical and chemical tests of soils associated with agricultural features to identify the locations and assess the fertility of prehistoric fields.

Ciolek-Torrello, Richard S (see Pedrick, Kathy) [701]

Claassen, Cheryl (Appalachian State)

[710] DOGAN POINT, NEW YORK, IN 1992.

The author has excavated at Dogan Point since 1987. In this paper new radiocarbon dates, soil data, shell ecology, and recent projectile point finds are presented. Several interpretations of Louis Brennan are supported, and several are contradicted.

Claggett, Stephen (NC Office of State Archaeology)

[707] RETROSPECTION ON THE HAW RIVER SITES, NORTH CAROLINA.

Data recovery and analysis at B Everett Jordan Lake were designed to maximize this rare opportunity to study a deeply alluviated series of stratified cultural deposits spanning southeastern prehistory. Emphasis was placed on interpreting the poorly understood Early and Middle Archaic archaeological sequence—by integrating lithic artifact studies with contemporary sedimentological and climatological data. The resulting explanatory model links early and mid-Holocene effective temperatures, and vegetational and faunal regimes with Archaic stage lithic technology. Results are discussed in terms of mid-range theory for the southeastern Archaic.

Clark, Wayne E (Jefferson Patterson Park & Museum)

[512] A MIDDLE ATLANTIC PERSPECTIVE ON EASTERN ALGONQUIAN MIGRATIONS AND EVOLUTION.

The Delaware, Chesapeake, and Pamlico Bays portion of the middle Atlantic tidewater represents the southern extent of Eastern Algonquian distribution. A multiple migration model best explains the historical distribution of Algonquian-speaking peoples. Archaeological evidence of reciprocity, mortuary ceremonialism, and tribal political complexity is examined to define a minimum of two successful migrations. The first is represented by the Middlesex-Delmarva Adena/Selby Bay-Conoy archaeological complexes (200 BC-AD 400); the second migration is correlated with the Point Peninsula-Kipp Island-Webb complexes (AD 600-800).

Cleere, Henry F (Antiquity)

[708] IRON ARTIFACTS AS AN INDICATOR OF SOCIAL STATUS: THE CASE OF ROMAN BRITAIN.

The paper examines the iron assemblages from a range of settlement sites in Roman Britain (1st to 4th centuries AD) and identifies patterns indicative of social status and groupings.

Clewett, S Edward (see Chase-Dunn, Christopher) [107]

Clottes, Jean

[608] WHO PAINTED WHAT IN UPPER PALEOLITHIC CAVES?

West European painted caves span a period of about 20,000 years. Even within a single cave, different artists worked at different times. One of the main problems faced by rock art specialists is establishing

successive operational sequences and assigning them to particular cultures. New methods (multiple pigment analysis, direct radiocarbon dating, TL) are beginning to be applied. This paper deals with the changes these methods bring about in our outlook, limits of the new methods, and comparison with traditional dating methods (stylistic sequence, archaeological context).

Cobb, Charles R, Jeffrey H Maymon & Randall H McGuire (SUNY-Binghamton)

[403] EXTERNAL RELATIONS: SOUTHWEST AND SOUTHEAST TIES TO MESOAMERICA.

The Southwest and Southeast exhibit very different types of evidence for links with Mesoamerica. Whereas the Southwest has yielded Mesoamerican artifacts, features (ballcourts), animals (macaws), and symbols, ties with the Southeast have been most strongly argued from thematic similarities between Mesoamerican and Southern Cult art styles, buttressed by the occasional find such as a possible stela in Florida. This paper compares not only the possible impacts of such ties at different spatial scales in the Southwest and Southeast, but explores how differences in the nature of the evidence between the two regions have strongly affected the types of explanations sought to account for those ties.

Cole, Sally J

[205] ROOTS OF ANASAZI AND PUEBLO SYMBOLISM AS EVIDENCED BY BASKETMAKER II ROCK ART AND MATERIAL CULTURE.

Basketmaker II rock art styles are well documented, and associated materials have been excavated and reported. Continuities in Basketmaker II style and symbolism are found throughout the Colorado Plateau and include the representation of distinctive subjects. The symbolic cohesion appears to have resulted from extensive sharing of ceremonial practices and paraphernalia. These developments provided a foundation for symbolism associated with Anasazi and western Pueblo socioreligious systems. Evidence for this lies in the nature of Basketmaker symbolism and its relationship to ceremonial materials and art of the Basketmaker III-Pueblo IV period and to those of the Hopi and Zuni.

Colten, Roger H (UCLA)

[508] FAUNAL EXPLOITATION AT THE EMERGENCE OF COMPLEXITY ON SANTA CRUZ ISLAND, CALIFORNIA.

Faunal data from four sites on Santa Cruz Island, California, are used to evaluate the proposition that a simple chiefdom developed in the region approximately AD 1200. Particular attention is paid to organizational aspects of the economy, such as specialization and exchange, by examining changes in composition of the faunal assemblages and differential distribution of body parts of bird and mammal taxa. These data are summarized for the time period spanning the emergence of complexity in the region.

Conard, Nicholas J (Connecticut)

[308] NEW EXCAVATIONS IN FLINDERS PETRIE'S "WORKMEN'S BARRACKS" AT GIZA.

Since the turn of the century when Petrie excavated the galleries west of Kephren's pyramid, this area of about 400 by 50 m has been known as the "workmen's barracks." In the winter of 1989 members of the Giza Plateau Mapping Project excavated parts of nine of the roughly one hundred galleries. These excavations documented many aspects of the architecture and demonstrated that the galleries were not workers' housing. The finds from the 1989 excavation suggest that the galleries were at least partially roofed and served as workshops and storage areas.

Conides, Cynthia A (Columbia)

[505] CRAFT SPECIALIZATION AND THE DEVELOPMENT OF THE STUCCOED POTTERY PAINTING TRADITION AT TEOTIHUACAN, MEXICO.

The mural paintings and the stuccoed and painted ceramics from Teotihuacan have long been viewed as a single painting tradition, produced by the same artisans. This paper challenges this assumption through stylistic and technical analysis of the painted programs on 120 stuccoed vessels. The alternate view suggests that artisans related to ceramic workshops may have produced the paintings, specifically those artisans that worked in the plano-relief decorative technique (post-fired scrape excision). The temporal relationship of stuccoed and painted ceramics to other pottery styles also is examined to suggest some economic implications for the development of this painting tradition.

Conkey, Margaret (UC-Berkeley) [Discussant 103]

Conner, Stuart (Montana Archaeological Society) & Lawrence L Loendorf (North Dakota)

[208] THE RADIOCARBON AGE OF THE PECTOL SHIELDS.

The age of the large, leather, Pectol shields has been debated since their discovery in a dry cave in Utah in 1925. A C-14 date obtained in 1968 was modern. Recently we noticed a shiny substance on

the shields (perhaps a preservative added after their discovery), which might have skewed C-14 analysis. Consequently, an unaffected sample was submitted for AMS. The new C-14 date of 364 ± 55 BP shows the Pectol shields to be contemporaneous with aboriginal rock drawings of shields. The similarity of Pectol shields with rock art drawings validates the latter as native pictures of prehistoric shields.

Connolly, Robert (Illinois)

[302] HOPEWELLIAN HABITATION AT THE FORT ANCIENT SITE.

Recent research has revealed evidence of Hopewell structures adjacent to the Fort Ancient hilltop enclosure in southwestern Ohio. The findings tend to support claims that Ohio Hopewell monuments boasted resident populations. Excavations have identified substantial structures, fire pits, limestone pavements, midden deposits, and several shallow pits on the upland plateau immediately east of the North Enclosure. The excavations are directly north of the area described by Olaf Prufer in 1965 as the "best candidate here for a true [Hopewell] settlement." Distinct scatters of Hopewell artifacts litter the surface of an additional 30+ ha east of the study area.

Corbett, Jack (Lewis & Clark) & Nelly Robles Garcia (Georgia)

[313] MANAGING ARCHAEOLOGICAL SITE PRESERVATION AND RESTORATION IN MEXICO.

This paper examines the organizations, issues, and policies affecting archaeological site preservation and restoration in Mexico. Mexico has a fairly well-organized and sophisticated approach to site management, yet resource scarcities, a shortage of trained personnel, inter-organizational rivalries, frequent policy shifts, and competing visions of what site preservation and restoration should accomplish serve to reduce its effectiveness and place important cultural treasures in jeopardy. Drawing on documents, interviews, and field study, the paper focuses on national, state, and local efforts to manage archaeological sites in Oaxaca.

Cordell, Linda S (California Academy of Sciences)

[403] HOW WERE PREHISTORIC SOUTHWESTERN POLITIES ORGANIZED?

Southwestern polities varied in size and degree of apparent integration. The variation was temporal and geographic. Southwest archaeologists have drawn on models of tribes, big man systems, chiefdoms, states, world economic systems, and recently, empires as plausible models for these polities. Some of the diversity in the models relates to the ground differences in polity scale. This paper examines food production and procurement, aspects of population density, craft production, trade, and the organization of labor as archaeologically visible dimensions useful for evaluating the models and resolving ambiguities.

Counce, Shari (see Harris, John) [110]

Coupland, Gary G (Toronto)

[603] THIS OLD HOUSE: CULTURAL COMPLEXITY AND HOUSEHOLD STABILITY ON THE NORTHERN NORTHWEST COAST OF NORTH AMERICA.

This paper challenges the traditional view that Northwest Coast houses and households increased dramatically in size with the emergence of cultural complexity. Evidence from the northern coast suggests little change in household size over a 1500-2000 year period, during which time ranked societies are thought to have evolved. The labor requirements of large-scale production associated with cultural complexity may have been accomplished in these communities by relatively small households working together as units under the organizational leadership of a village chief, a system quite different from that which existed during the early historic period.

Courty, Marie-Agnes (CNRS)

[207] THIRD MILLENNIUM ENVIRONMENTAL ADAPTATION: THE CANAL SYSTEM OF DRY-FARMING NORTHERN MESOPOTAMIA.

Deep trenching at the foot of archaeological sites on the Habur Plains, NE Syria, provides stratigraphic records of the Holocene evolution of the flood plain. The hydrographic system suffered an important reduction of the alluvial discharge during the 5th-4th millennia when stone embankments were constructed at the foot of settlements. During the 3rd millennium, evidence suggests that the canal system was renewed because of flood plain accretion due to siltation. At ca 2000 BC exploitation of the flood plain was drastically modified because of desertification of the region.

Cowan, C Wesley (Cincinnati Museum of Natural History)

[1] THE DAWN OF HISTORY AND THE DEMISE OF THE FORT ANCIENT CULTURES OF THE MIDDLE OHIO VALLEY.

Shortly after AD 1450, much of the middle Ohio Valley witnessed a reorientation of human population. Wholesale abandonment of formerly occupied drainages, development of new forms of

community types, and evidence of increasing communication with geographically disparate peoples marked the onset of a period of remarkable cultural change in the Midwest heartland. This period culminated by 1690 in the near total abandonment of the middle Ohio Valley in an area that today encompasses large portions of western West Virginia, southern Ohio, central and northern Kentucky, and southwestern Indiana.

Cowgill, George L (Arizona State)

[505] TEOTIHUACAN: ACTION AND MEANING IN MESOAMERICA.

We cannot make sense of Teotihuacan-related manifestations throughout Mesoamerica without paying attention to what Teotihuacan meant in various places. Its significance was grounded in part on some very concrete military and political phenomena, although evidence for a strong economic system is weak. Preoccupation with material aspects is inadequate, however. Meanings generated by Teotihuacan were themselves resources, both for the city and for other groups in Mesoamerica. This is illustrated by a variety of evidence, including recent finds at the Feathered Serpent Pyramid in the Teotihuacan Ciudadela.

Cowin, Verna L (Carnegie Museum of Natural History)

[504] IDENTIFYING ARCHAEOLOGICAL RESOURCES: A CASE STUDY OF PITTSBURGH PENNSYLVANIA.

Ten years ago, Pittsburgh's archaeologists discovered that significant archaeological resources survived urban development and two major redevelopment episodes within the central business district. The city has progressed from early emergency salvage excavations, through a general survey of Pittsburgh resources, to a current project wherein computerized maps help city planning and the Urban Redevelopment Authority identify the archaeological potential throughout the city and particularly at proposed construction sites. This paper is offered as a cultural resource management model for other major cities.

Cowin, Verna L (Carnegie Museum of Natural History)

[601] WESTERN PENNSYLVANIA ARCHAEOLOGY.

Slides from the Carnegie Museum of Natural History's archives illustrate the history of 95 years of archaeological investigations in western Pennsylvania and chronicle the results of excavations throughout the region. The history of human utilization of the land draining the Ohio River is outlined, from the prehistoric occupations at Washington County's Meadowcroft rockshelter to 19th-century commercial enterprises in downtown Pittsburgh. The chronology is elaborated with comments about the availability of resources within the area and with the archaeological data that reflect changes as well as continuity in settlement and subsistence strategies.

Crabtree, Pam (New York)

[612] THE ORIGINS OF THE ENGLISH WOOL TRADE: FAUNAL REMAINS FROM THE ANGLO-SAXON SITE OF BRANDON.

Brandon is a Middle Saxon (ca AD 650-900) settlement located in eastern England. Ten seasons of excavation at Brandon have produced a rich and diverse faunal collection of over 150,000 fragments. When compared to the faunal assemblage from the nearby early Saxon site of West Stow, the Brandon assemblage shows an increased reliance on adult male sheep. The Brandon harvest profiles, when combined with morphological, paleobotanical, and artifactual evidence, indicate an increasing use of sheep for wool production in the Middle Saxon period. This shift toward wool production can plausibly be related to the rapid development of urbanism and trade in the Middle Saxon period.

Craig, Douglas B (Desert Archaeology), David Jacobs (Arizona State) & Mark D Elson (Desert Archaeology)

[701] ARCHITECTURAL VARIABILITY IN THE TONTO BASIN: A ROOSEVELT PHASE PERSPECTIVE.

The Roosevelt phase (ca AD 1150-1300) in the Tonto Basin witnessed the emergence of platform mounds as a distinctive form of public architecture. During the same period of time, important changes in household organization and domestic architecture also were taking place. This study examines some of the changes at the household level as a backdrop for understanding changes at the community-wide level. Examples from recent investigations at several platform mound communities in the eastern Tonto Basin are discussed.

Craig, Douglas B (see Doelle, William H) [701]

Crawford, Gary W (Toronto)

[402] ARCHAEOLOGICAL GRASSES AND ANTHROPOGENESIS IN PREHISTORIC JAPAN.

Human induced changes to local habitats created important collecting territories during the Early Jomon. By the Middle Jomon, gardening may have been one form of anthropogenic influence. At least

one grass, barnyard grass, may have been grown. Several other grasses figure prominently among the Jomon period plant remains. By 300 BC wet rice paddies were being constructed in southwestern Japan, and by AD 300 a dryland farming complex arose in the northeast. Both systems relied on cultigen grasses and had specific weed grass associations. This paper reviews the archaeological grasses in Japan and explores their ecological and economic meaning.

Creamer, Winifred (Northern Illinois)
**[603] POLITICAL INTEGRATION IN THE PROTOHISTORIC RIO GRANDE VALLEY:
 IMPLICATIONS OF AGGREGATION FOR MOBILE HORTICULTURALISTS.**

Many Puebloan sites dating to the period AD 1450-1680 are unusually large for the prehistoric American Southwest. Recent archaeological research in the northern Rio Grande Valley indicates that only portions of the seemingly extensive villages were occupied at any given time. Blocks of rooms were built in places that were favorable for settlement based on the presence of water sources and available land. Roomblocks were periodically abandoned and new ones built nearby. Over time this created the impression of huge villages governed by egalitarian means. The implications of this serial construction for theories about prehistoric Southwest political organization are discussed.

Creel, Darrell G (Texas-Austin)
[502] RESEARCH AT THE OLD TOWN RUIN, A MIMBRES SITE IN LUNA COUNTY, NEW MEXICO.

Systematic investigations at the Old Town site began in 1989 as part of the Texas A&M University archaeological field school and have continued since then as a project of the University of Texas at Austin. Excavations have focused on assessing the research potential of this large and extensively looted Mimbres site. Seven much disturbed Classic period surface rooms have been excavated. An intensive effort also has been made to acquire information on the site from archives and widely dispersed collections.

Creger, C Cliff, Alan W Raymond & Amy J Dansie (US Fish & Wildlife Service)
**[410] TREATMENT OF HUMAN REMAINS AT STILLWATER NATIONAL WILDLIFE REFUGE,
 NEVADA.**

The Memorandum of Understanding Concerning Human Remains (1988) is a standing document drafted prior to the Native Graves Protection and Repatriation Act in response to flood exposure of hundreds of burials. The Memorandum outlines procedures, which correspond to the Repatriation Act, for identification, excavation, curation, analysis, non-destructive subsurface crypt reinternment, and future access of over 5000 prehistoric remains on the Stillwater National Wildlife Refuge. This local solution is an effective compromise, which may be applicable elsewhere, between scientific research and Native American beliefs. The Memorandum has guided a successful program of archaeology, physical anthropology, and interpretation at Stillwater.

Cressey, Pamela J (Alexandria Archaeology)
[504] PLANNING THE FUTURE OF A CITY'S ARCHAEOLOGICAL PAST: CODES, MASTER PLANS, AND COMMUNITY FORUMS IN ALEXANDRIA, VIRGINIA.

The City of Alexandria Code established the Alexandria Archaeological Protection Procedure in November, 1989. This mandated protection procedure only operates in large-scale commercial developments; small, residential, and neighborhood projects needed a different approach. By writing the historic preservation chapter of the Alexandria Master Plan, Alexandria archaeology integrated architectural, structural, and archaeological data for a fuller view of the city's material culture and landscape. The Alexandria Archaeological Commission is currently holding neighborhood forums throughout the city to share and evaluate the plan.

Crosby, Constance (Massachusetts Historical Commission)
[709] "WHEN THEIR ANCESTORS FIRST CAME . . .": THE ARCHAEOLOGY OF WAMPANOAG ORAL TRADITIONS.

This paper explores possible links between Wampanoag oral traditions and archaeological evidence for the development of an intensive focus on marine resources over the past 5000 years among Indian peoples living in southeastern Massachusetts.

Cristino, Claudio (see Steadman, David) [307]

Crossen, Kristine J (see Holmes, Charles E) [312]

Crotty, Helen K (Archaeological Society of New Mexico)
[502] THE ARCHAEOLOGICAL SOCIETY OF NEW MEXICO'S ROCK ART RECORDING FIELD SCHOOL AT THREE RIVERS PETROGLYPH SITE, NEW MEXICO.

Since 1987, the ASNM's Rock Art Recording Field School has been documenting the rock art at the Three Rivers Petroglyph site under a cooperative management agreement with the Bureau of Land

Management. Volunteers recruited nationally spend one to two weeks at the site photographing, drawing, and mapping the petroglyphs, noting any natural deterioration or vandalism. The BLM provides camping facilities and support services and pays for film and processing of photographic records. On completion in 1992, the project will provide a basis for monitoring future visitor impact and a database for analysis and interpretation of this renowned rock art site.

Crumley, Carole (North Carolina-Chapel Hill) [Discussant 708]

Cummings, Linda Scott (Paleo Research Laboratories)

[501] PHYTOLITH ANALYSIS AT ARCHAEOLOGICAL SITES FOR RECOVERY OF SUBSISTENCE DATA AND IDENTIFICATION OF STAINS.

Phytoliths and crystals may be recovered representing utilization of plants as foods and for other purposes. Recovery of *Opuntia* crystals may represent exploitation of prickly pear fruits and/or pods. Concentrations of phytoliths at butchering or kill sites probably represent deterioration of stomach/intestinal contents of animals. Interpretation of pits and stains in the Pacific may be aided by recovery of phytoliths representing palms and other trees. Specific examples of recovery of phytoliths in archaeological contexts from a variety of sites are presented to illustrate use of phytolith analysis for interpretation of non-environmental data.

Curet, Antonio (Arizona State)

[415] DEMOGRAPHIC AND SOCIOPOLITICAL CHANGE IN PREHISTORIC PUERTO RICO.

Several of the hypotheses suggested for the development of social complexity in the Caribbean are based on population pressure premises. The Archaeological Project of the Valley of Maunabo has been conducting a regional study designed to test such hypotheses in a small coastal valley in southeastern Puerto Rico. A sampling survey and surface collections were used to gather data for calculating population estimates and the carrying capacity of the valley. The results of the study show that although population increase was experienced at the same time as chiefdoms developed, it never reached the carrying capacity of the valley, leading to the rejection of most of the hypotheses.

Curnow, Anna (see Meadow, Richard H) [207]

Curren, Caleb (see Holstein, Harry O) [310]

Curtin, Edward V (Skidmore)

[705] INTEGRATING SMALL SITE METHODS IN REGIONAL RESEARCH: AN EXAMPLE FROM THE HUDSON VALLEY.

Two recent initiatives, the Upper Hudson Survey and Planning Study and the Small Sites Methods Project, have identified the need for an approach to discovering and studying small or low density archaeological sites in eastern New York state. Methods developed for a variety of cultural resource management projects address the need for small sites research. Several examples suggest changes in approaches to field work, and reevaluate assumptions about the comprehensiveness of surveys and the nature of archaeological data in the Northeast.

Czaplicki, Jon S & Thomas R Lincoln (Bureau of Reclamation)

[702] NOT JUST COMPLIANCE: FEDERAL ARCHAEOLOGY PROJECTS AND THEIR SIGNIFICANT CONTRIBUTIONS TO ARIZONA PREHISTORY.

Large federally sponsored archaeology projects are complex both in their management and logistics and in their research orientation and methods. In its Theodore Roosevelt Dam Archaeology Project, the Bureau of Reclamation has combined 25 years of management practices with an innovative research approach to plan, design, and implement a research program that is contributing major new information about prehistoric Salado culture (AD 1050 to 1450). The research is also contributing to Reclamation's own considerable history and to the development of American society in the greater southwestern United States.

Dabney, Mary K (Columbia)

[507] STATE FORMATION IN PREHISTORIC CRETE.

Palaces were the first sites extensively excavated during the archaeological exploration of prehistoric Crete. The traditional approach focuses on the construction of the palaces in the early Middle Bronze Age as the archaeologically recorded event representative of state formation. This study, however, shows that supporting evidence for organizational complexity, such as survey and mortuary data, indicates that state formation in Crete proceeded throughout the Middle Bronze Age. As the development of religious rituals and secondary economic centers led to increased social and economic integration, the palaces became the centers of small states.

Dahlin, Bruce H (Howard), Barbara Leyden (South Florida) & Mark Brenner (Florida)

[407] LOWLAND MAYA ENVIRONMENTS AT THE PRECLASSIC/EARLY CLASSIC TRANSITION.

Paleoecological cores from the southern North Atlantic region, including the eastern and western margins of the Northern Plains of Yucatan, Mexico, record dramatic climatic and sea level changes during and after the Maya Preclassic and Early Classic periods. These data are presented and discussed with respect to the cultural and demographic changes with which they seem to be associated.

Dancey, William S & Paul J Pacheco (Ohio State)

[302] THE OHIO HOPEWELL SETTLEMENT PATTERN PROBLEM IN HISTORICAL PERSPECTIVE.

Until recently, research on Middle Woodland settlement pattern has been nearly non-existent in Ohio. An exception is Olaf Prufer's work in the 1960s, although even his sample was small, and systematic analysis was limited to a single site. Within the last decade the data base has increased dramatically, and it is now possible to begin to explore Prufer's proposition that Ohio Hopewell populations lived in dispersed farmsteads centered upon vacant ceremonial centers. This paper examines historical constraints on current attempts to make sense of recent settlement archaeology and identifies the elements of a regional-scale strategy for testing the Prufer model.

Dansie, Amy J (see Creger, C Cliff) [410]

David, Francine (see Enloe, James G) [103]

Davidson, Dale (see Geib, Phil R) [205]

Davin, Ann K (Public Archaeology Lab)

[412] PREHISTORIC SITE DISTRIBUTIONS AND DENSITY AROUND CAPE COD'S KETTLE HOLE PONDS.

Prior to completion of a number of recent CRM surveys, inland sections of Cape Cod were underrepresented in New England's archaeological record. Kettle hole ponds are one characteristic feature of the varied glacial topography of this peninsula. These ponds are generally considered to have a high prehistoric archaeological sensitivity. Recent investigations have found that prehistoric land use and occupation near these ponds varied greatly. Evidence of continuous occupation is found near some ponds, while others appear to have been occupied sporadically for hunting/gathering. This paper synthesizes recent survey findings and offers preliminary explanations on variability in use of this environmental setting.

Davis, Dave D (Southern Maine)

[503] AFTER THE SALADOID IN ANTIGUA, WEST INDIES.

Survey and excavations have revealed a substantial post-Saladoid occupation on Antigua. Excavations by the author at Nonsuch Bay and by Rouse at Freeman's Bay and Indian Creek reveal post-Saladoid ceramic similarities with other Leeward Islands and Puerto Rico. Survey data indicate that Antigua, like several other Leeward Islands, witnessed marked population growth after Saladoid times. Evidence gathered to date does not support a model of increased stress on marine resources, although settlement distributions may reflect expansion to poorer agricultural zones. Human occupation after AD 1000 has not been firmly documented.

Davis, Hester (Arkansas Archaeological Survey) [Discussant 707]

Deagan, Kathleen A (Florida)

[601] ARCHAEOLOGY AT COLUMBUS' FIRST NEW WORLD SETTLEMENTS: LA NAVIDAD AND LA ISABELA.

Archaeological excavations at the site of La Navidad (Columbus' settlement founded after the Santa Maria wrecked in 1492), and La Isabela, established by Columbus in 1493, have shown for the first time what the conditions of life were like for America's first European settlers. The sites, which are located in Haiti and the Dominican Republic respectively, have been excavated by the University of Florida since 1983. This presentation discusses the search for the sites, and some of the new information we have learned about the Columbus era that has been revealed by their excavations.

Deal, L Michael (Memorial -Newfoundland) & Melissa Hagstrum (Washington)

[703] CERAMIC REUSE BEHAVIOR AMONG THE MAYA AND WONKA: IMPLICATIONS FOR ARCHAEOLOGY.

Material culture reuse is a phenomenon that appears to be common to all human societies. However, the socioeconomic conditions of reuse are still poorly understood. Questions concerning what items or item fragments are considered reusable and for what purposes, where and how often reuse

occurs, and the social and economic status for those who practice reuse most often have important implications for understanding prehistoric artifact variability and spatial patterning. These and other aspects of reuse are addressed through a comparison of ceramic reuse practices among the modern Chiapan Maya and Peruvian Wonka.

DeCarlo, Valerie (Advisory Council on Historic Preservation)

[101] CURATION, OR WHY ARE WE SAVING ALL THIS STUFF?

The disposition of federal archaeological collections has become an enormous problem. Inadequate space and limited funds are placing the fate of existing collections in question, to say nothing of the complications faced by ongoing and future projects. In addition, new legislation regarding potential repatriation has further complicated the future of federal collections management. This paper examines the current curation crisis and discusses agency responsibilities under federal legislation. Suggestions for solving the problem are presented.

Décima, Elena B (Timelines) & Dena F Dincauze (Massachusetts-Amherst)

[709] 4000 YEARS AGO IN THE BACK BAY OF BOSTON: THE BOYLSTON STREET FISH WEIR REVISITED.

The latest investigations of the Boylston Street Fish Weir, a repeatedly utilized Late Archaic site, have produced new insights into construction techniques, utilization, and chronometric sequence of the weir structures. The archaeological monitoring of the construction of new buildings, together with excavations and interdisciplinary studies (some still pending), clearly establish the existence of several fish weirs, spanning approximately 2000 years, which were continuously modified to accommodate topographical and environmental changes through an evolving technology.

Deloria, Vine (Center for Studies of Ethnicity & Race in America) [Plenary session]

[216] SACRED SITES AND SACRED COWS.

Delpech, Françoise (Université de Bordeaux I)

[506] SEASONAL STRATEGIES OF UPPER PALEOLITHIC HUNTERS IN WESTERN EUROPE.

In this paper I present and discuss published information concerning the hunting seasons of large mammals during the Upper Paleolithic in western Europe. The Aquitaine region serves as an example where climatic and topographic factors dictated animal seasonal behavior that resulted in the use of variable strategies by local hunters. The conclusions obtained in this research are based on methods for age definition which are still under development.

Denny, J Peter (Western Ontario)

[512] ALGONQUIAN AND IROQUOIAN COMPETITION IN THE NORTHEAST AFTER 1500 BC.

Archaic populations of the Northeast probably spoke languages related to Iroquoian-Siouan-Caddoan. Algonquians intruded around 1400 BC, moving down the Missouri from the Columbia Plateau and occupying the upper Illinois and mid-Ohio drainages. From these Midwestern centers, their social and cultural ideas were spread, by means of Red Ocher/Glacial Kame ceremonialism, to groups along Lake Michigan, the Scioto, and Lake Champlain. Middlesex, based at Lake Champlain, stimulated development of Eastern Algonquian languages. Meadowood was an imitative response by Northern Iroquoians.

DeRoche, Carole D (Cambridge)

[311] ORGANIZATION OF TEXTILE PRODUCTION IN FIRST MILLENNIUM BC BRITAIN.

Great changes in economic and social organization are documented for the last millennium of Britain's prehistory. The emergence of specialization in both metal and ceramic production reflects these developments. Much recently excavated material related to fabric manufacture, including preserved fragments of cloth and tools associated with spinning and weaving, now allows the textile technology to be similarly assessed. Intra-site spatial patterning indicates some specific activity areas within settlements. The correlation of the apparent production diversity with variation in environmental, regional, and chronological factors is examined.

Diamanti, Melissa (Archaeological & Historical Consultants)

[602] CONJUNCTIVE APPROACH TO ANALYSIS OF LARGE HOUSEHOLDS.

The wide range of analyses undertaken since the inception of the Copan Archaeological Project, Phase II, has produced a rich body of data for the interpretation of Late Classic Maya society. Extensive excavations in the residential zone at Copan have uncovered large elite house compounds. Evidence from many sources has been brought together to reconstruct the social organization of these elite households, including ethnographic analogy, architectural lay-out and energetics, identification of assemblages, spatial distribution of artifacts, and paleodemography.

Dibble, Harold L (see Sanders, Helen) [211]

Dillehay, Tom D (see Tuross, Noreen) [212]

Dinan, Elizabeth H (see Pearsall, Deborah M) [501]

Dincauze, Dena F (see Décima, Elena B) [709]

Dirkmaat, Dennis (Mercyhurst), Jacquie Thornberry & Elizabeth Ramos (Pittsburgh)
[509] THE DEMISE OF THE PREHISTORIC MONONGAHELA IN SOUTHWESTERN PENNSYLVANIA: IS THERE EVIDENCE FOR LONG-TERM STRESS?

The causes for the sudden disappearance of the late prehistoric Monongahela in southwestern Pennsylvania continue to be debated. One of the avenues for addressing the issue involves the analysis of the ecofactual remains from these sites with respect to documenting long-term environmental and/or food resource stress. The search for evidence of biological stress begins with the large vertebrate assemblage from the Howarth-Nelson locus (36Fa40) and focuses on significant changes in species composition, age distribution patterns, and butchering/processing techniques during late prehistoric times. The second line of evidence is drawn from the human pathology profiles and stress indicators, as well as demographic patterns at the Howarth-Nelson locus and three contemporaneous sites in the area.

Dirkmaat, Dennis (see Adovasio, J M) [211]

Doak, Colin J (Trent)

[412] PIPES, POLITICS, AND POLEMICS: IROQUOIAN CERAMIC PIPES IN SOCIAL AND RITUAL CONTEXT.

Ceramic pipes are an enigmatic facet of Iroquoian material culture. Most analyses have viewed pipes as playing a passive role within Iroquoian society. I believe pipe styles should be regarded as actively manipulated components within Iroquoian social and political world-view. The purpose of this paper is to examine the articulation between pipe styles and Iroquoian social and ritual contexts.

Doelle, William H, Douglas B Craig & Henry D Wallace (Desert Archaeology)

[701] MEASURING PREHISTORIC DEMOGRAPHIC TRENDS.

Demography is an important causal variable in many anthropological models of culture change, but the difficulty of obtaining precise population measures from archaeological data limits our ability to make those models testable. Population trends are being measured on two scales in the Tonto Basin. On a regional scale, a large-site data base has been compiled that allows consideration of large-scale population movements or changes over time. On the local scale, architectural and artifact data are being used as separate, but complementary sources for evaluating smaller-scale patterns of population change. Methodological issues and preliminary results are considered in this paper.

Doering, William, Michael McFaul (LaRamee Soils Service) & William R Latady (Division of Conservation Archaeology)

[410] ARTIFACT AND PARTICLE SIZE ANALYSIS IN ASSESSING ARTIFACT TRANSPORT.

Sediment and lithic samples were recovered at 10 cm intervals from block excavations at an alluvial/coluvial interface and a colluvial fan. Dry sieving of sediment samples produced a clast variability curve which was compared with flake abundance. Results suggest that these two variables may be helpful in assessing depositional environments as well as the potential for artifact transport. Corresponding peaks of clast size and flake abundance suggest that flake variability is due to artifact transport. On the other hand, peaks in the flake curve compared with sediment uniformity are thought to indicate concentration due to occupation rather than clast transport.

Doering, William (see McFaul, Michael) [710]

Dohm, Karen M (Smithsonian)

[205] SURVEY EVIDENCE FOR BASKETMAKER II VILLAGES.

A recent survey supports an earlier suggestion for the presence of Basketmaker II villages on Cedar Mesa, in southeastern Utah. These potential villages contain few houses, the houses are loosely clustered, and duration of occupation may have been brief. That the house clusters represent mostly contemporaneous occupations is argued because individual residential areas within aggregations have coherent spatial layouts. Scale and circumstance of these house clusters may be part of the origins of later Anasazi villages.

Donahue, Jack (Pittsburgh) [Discussant 109]

Donahue, Jack (see Fuess, Martin T) [503]

Donahue, Jack (see Duncan, Rick) [710]

Donahue, Randolph E (Sheffield) & Daniela B Burroni (Siena)

[311] PETRIOLI III SOUTH AND THE TRANSITION TO AGRICULTURE IN THE WEST MEDITERRANEAN.

Two fundamental problems for the transition to agriculture in the West Mediterranean continue to impede advances in the understanding of this process. The first is the hotly debated substantive issue of whether the process is primarily the result of colonists or of the indigenous Mesolithic populations undergoing culture change. The second, primarily a theoretical issue, is the specific nature of culture contact or interaction between "agriculturalists" and "hunter-gatherers." Both issues are addressed with data from the early Neolithic occupation level (7480 F1 100 BP) of Petriolo III South Tuscany, Italy.

Dore, Christopher D (see Smyth, Michael P) [411]

Dorn, Ronald (Arizona State)

[303] ROCK VARNISH DATING OF PETROGLYPHS.

Rock varnish starts to form on rock engravings soon after the motif is engraved. If electron microscope and light microscope examination reveals that the varnish is suitable for dating, it can be used to place a minimum age on petroglyph manufacturing. Accelerator radiocarbon dating of organic fragments encapsulated by the varnish provides the most accurate minimum-limiting age. Cation-ratio dating provides calibrated-age estimates, and microstratigraphic investigations provide relative-age estimates. Petroglyphs in the drylands of western North America and South Australia are presented as examples.

Douglas, John G (BLM) [Discussant 702]

Doyel, David (Arizona State)

[110] IN THE SHADOW OF THE RIM: EXPLAINING PREHISTORIC SETTLEMENT DISTRIBUTIONS IN THE UPLANDS OF CENTRAL ARIZONA.

Extensive survey in high elevation (1500-2500 m) localities under the Mogollon Rim escarpment in Arizona has yielded data on 300 prehistoric archaeological sites. Most sites are small, have limited numbers of artifacts, and usually lack surface evidence of architecture. Subsistence strategies involving hunting, gathering, and agriculture have been suggested. Discussions of assemblage variation and effective environment focus on identifying factors that influenced settlement distributions. Ethnographic data are used to illuminate alternative subsistence and settlement models.

Drass, Richard R (Oklahoma)

[314] EARLY PLAINS VILLAGE ADAPTATIONS ON THE SOUTHERN PLAINS.

Investigations at several villages along the eastern margins of the Southern Plains have provided information on the transitional Plains Village period (AD 800-1250) and the development of Plains Village societies. Tool assemblages, pottery technology, and lithic resource use indicate a gradual development of a Plains Village adaptation. Macrobotanical remains support some previous suppositions on the importance of corn horticulture. However, bison were not a significant food source for these early villagers. Dry conditions around AD 1250-1300 may have resulted in an increased bison population in the eastern prairies of Oklahoma allowing for selection of increased bison hunting rather than intensified horticulture.

Drennan, Robert D (Pittsburgh)

[603] ONE FOR ALL AND ALL FOR ONE: ACCOUNTING FOR VARIABILITY WITHOUT LOSING SIGHT OF REGULARITIES.

Cultural evolutionary approaches have emphasized broad regularities in the development of complex societies worldwide, and single models for their emergence have been applied indiscriminately to "chiefdoms" and "states" of all sorts. Subsuming many cases under a single explanation is intellectually satisfying, but comparative studies show important qualitative differences not only between chiefdoms and states but also between members of each class. Successful explanations of complex societies, then, must account not only for the broadest general similarities but also for substantial variation. Some approaches to social complexity are much more promising than others when considered in this light.

Drennan, Robert D (Pittsburgh) [Discussant 403]

Driver, W David, Lauren A Sullivan (Texas-Austin) & James F Garber (Southwest Texas State)

[706] RITUAL ACTIVITY AT THE SITE OF BLACKMAN EDDY, BELIZE.

Investigations at the Maya site of Blackman Eddy, Belize, have revealed evidence of complex ritual activity. Located at the edge of the Belize River Valley, this site served as a medium-sized ceremonial center during the Late Preclassic and Early Classic periods. The 1991 field season included excavations

within a small *plazuela* group near the site core. These excavations exposed several deposits that contained artifact assemblages typically associated with ritual behavior. This paper examines these deposits in light of recent interpretations of possible dedication and/or termination rituals within the Maya area.

Dublin, Susan (CUNY) & Nan A Rothschild (Barnard)

[304] DEEP TRASH: A TALE OF SEVERAL MIDDENS.

Excavation at the farming village of Lower Pescado, an aggregated pueblo occupied and abandoned during the 14th century and reoccupied as a satellite settlement of Zuni Pueblo during the 19th, has provided comparative information on use and perception of space and on activity patterns from a single geographic locale during two widely separated periods. A comparison of patterns of trash disposal from prehistoric and historic contexts reveals basic shifts in midden location, assemblage content, and artifact density. These data are then used to assess changes in pre- and post-contact social organization at Zuni.

Duff, Andrew I (Arizona State)

[304] THE STRUCTURE OF ECONOMIC INTERACTION THROUGH CERAMIC SOURCING: IMPLICATIONS FOR SOCIOPOLITICAL ORGANIZATION.

This paper examines the nature of social and economic integration in the Zuni area when the first large aggregated communities appeared (AD 1175-1275). Compositional analysis and refining experiments of decorated and utility wares are used to examine intra-settlement and intra-valley interaction near Ojo Bonito, and with the community near Heshotauthla. Reconstructing patterns of interaction at this fine scale of resolution provides a much more accurate means of assessing organizational models than has previously been possible.

Duncan, Rick & Jack Donahue (Pittsburgh)

[710] SEDIMENT ANALYSIS AND PALEOCLIMATE, DANGER CAVE, UTAH.

An analysis of sediments from a sediment column at Danger Cave, Utah, was used to determine paleoclimate and occupational change during the last 10,000 years. The analysis included grain size and shape, percent carbonate and organic carbon, pH, mineralogy, and microscopic examination of sediment fractions. Five sediment sources were identified: lacustrine, rock spall, eolian, slope wash, and biogenic. A paleoclimatic model, constructed from the analysis data, suggests more intensive human occupation during warm/dry intervals, probably related to the availability of nearby lake margin resources as determined by fluctuations in the Lake Bonneville shoreline.

Dunford, Frederick J (Cape Cod Museum of Natural History)

[709] CONDITIONAL SEDENTISM: THE LOGISTICAL FLEXIBILITY OF ESTUARINE SETTLEMENTS IN CIRCUMSCRIBED ENVIRONMENTS: LATE WOODLAND — SETTLEMENT SYSTEMS ON CAPE COD, MA.

The archaeological record of Cape Cod includes both large multicomponent Woodland sites situated at the major estuaries, and much smaller, contemporaneous sites often located more than 1/4 mile from the immediate coast. While the functional relationship between these two types of sites is not always clear, it can be demonstrated that population aggregation and periodic dispersal were significant elements of Late Woodland settlement systems on Cape Cod. Focusing on the archaeological record of the outer Cape, it is argued that aggregation and dispersal were complementary elements of a conditional sedentism which manifested all of those demographic, economic, social, political, and territorial attributes traditionally associated with sedentism.

Dunn, Robert (Corps of Engineers)

[707] GEOARCHAEOLOGICAL MANAGEMENT OF THE ARKANSAS RIVER NAVIGATION SYSTEM.

This paper discusses the geoarchaeological management program for the McClellan-Kerr Arkansas River Navigation System (ARKNS) in Arkansas. A geoarchaeological approach has been developed which integrates geomorphological landform analysis, the GIS software package GRASS, modem-accessed computerized databases, and a variety of innovative archaeological techniques. The geoarchaeological approach is conceptually similar to that developed by geographer Karl Butzer in *Archaeology as Human Ecology*. Landforms with horizontal and vertical dimensions become the principal units of analysis. Landforms are conceptualized as three-dimensional repositories of buried cultural deposits.

Dunnell, Robert C (Washington)

[203] WHAT IS IT THAT ACTUALLY EVOLVES?

In applications of evolutionary theory in archaeology it is often not clear what actually is evolving. While human being may present some special problems in this regard, the issue is by no means a

settled one in biology as evidenced by the continuing debates on the nature of species. This literature is reviewed, and the implications of cultural trait transmission on the scale and units of selection in cultural case are considered. It is clear that archaeological systematics are not well adapted for the use of evolutionary theory.

Dunning, Nicholas (Cincinnati) & Timothy Beach (Georgia)

[407] SOIL EROSION, SLOPE MANAGEMENT, AND ANCIENT TERRACING IN THE MAYA LOWLANDS.

Whether significant land degradation in the form of soil erosion factored in the Classic Maya collapse has been a persistent question over the years. This paper examines data on soil loss and sedimentation and the decision to terrace certain areas and not others in the Maya lowlands. Particular attention is given to data recently obtained by the Petexbatún Regional Archaeological Project. Comparison is made with other regions, and a typology of terracing is suggested as part of a behavioral model reflecting a combination of slope management considerations, regional environmental circumstances, and socioeconomic necessities.

Dunning, Nicholas (see Killion, Thomas W) [704]

Durand, Stephen R (Eastern New Mexico), Martin R Rose & Fred L Nials (Desert Research Institute)

[514] TECHNIQUES FOR IDENTIFYING TREE SOURCE AREAS.

At least 200,000 trees were used in building construction at Chaco Canyon, New Mexico, AD 900-1200. Trees are not present in the canyon today, and the source of construction timbers is a matter of contention. This paper presents the results of a study that has established geochemical and dendroclimatological techniques which may provide a means of defining source areas for Chaco Canyon construction timbers. Analysis of 62 trees growing in separate areas of the San Juan Basin demonstrates that tree stands can be distinguished by the trace elements present in the tree wood and by the climatic signal derived from the tree ring indices.

Egan, Kathryn C (see Lovis, William A) [204]

Ehrenreich, Robert M (National Academy of Sciences) & Michael L Wayman (Alberta)

[708] ACCULTURATION IN THE ARCTIC: THE INUIT MEET SIR MARTIN FROBISHER.

Frobisher's expeditions to Baffin Island between 1576 and 1578 mark the Inuit's first encounter with Europeans. Although historical records state that interaction was predominantly confined to scavenging and hostage taking, the effect on both cultures is evident in local folklore and western journals. The discovery of apparently European-derived iron within 16th-century, indigenous tent-rings during recent excavations has confirmed that the Inuit were able to obtain smelted metal by either ransacking European sites or trading with the expeditions. This presentation explores the actual extent of interaction between cultures using the examination of archaeological ironwork to elucidate Inuit legend and historical record.

Ellick, Carol J (Statistical Research) & Cheri Bludau (Tucson Unified School District)

[106] PRACTICUM: WHY ARCHAEOLOGY IN THE CLASSROOM?

Archaeology can be used as a tool to teach major concepts to elementary age students. By hooking into what a child already knows, the teacher can lead them through the steps that allow the students to go beyond the basics to the level of hypothesizing. This activity-based session explores teaching through the use of concept learning, and projection with archaeology as the key.

Elson, Mark D (see Craig, Douglas B) [701]

Elston, Robert G (Intermountain Research) [Workshop 401]

Elston, Robert G (see Carambelas, Kristopher R) [711]

Engelbrecht, William (Buffalo State)

[102] POPULATION TRENDS AMONG THE ST LAWRENCE IROQUOIANS.

During late prehistoric times there was a large Iroquoian population in northern New York, just east of Lake Ontario and south of the St Lawrence River. Nineteenth and early 20th century accounts describe at least 75 village sites in this region. Sometime during the late 15th or early 16th centuries, the region was abandoned. Warfare, European disease, and climatic change all have been suggested as factors involved in this abandonment. Current research seeks to trace population shifts during the 14th century through to the abandonment in order to document whether this depopulation was sudden or gradual and whether any trend of population nucleation or dispersion was present. Trends in site size, natural defensibility, and elevation of settlements also are considered.

Engwall, Evan (Illinois-Urbana-Champaign)

[610] ARCHAEOLOGICAL INVESTIGATIONS OF CHORRERA CULTURE: TABUCHILA PHASE CERAMICS FROM NORTHERN MANABÍ, ECUADOR.

Recent archaeological investigations in the Jama River drainage in western Ecuador have documented the presence of a significant Late Formative Chorrera Culture occupation, locally designated the Tabuchila phase. Systematic regional survey and test excavations have revealed a diverse Tabuchila phase ceramic assemblage, segregated into early and late components. Archaeological sites and ceramics are described in this paper and placed within local and regional context. The Jama Valley ceramics are compared with "Chorreroid" ceramics from other regions of Ecuador, including the Santa Elena Peninsula, Guayas Basin, and the highlands.

Enloe, James G (Iowa), Francine David (CNR) & Timothy S Hare (Iowa)

[103] PATTERNS OF FAUNAL PROCESSING AT SECTION 27 OF PINCEVENT: THE USE OF SPATIAL ANALYSIS AND ETHNOARCHEOLOGICAL DATA IN THE INTERPRETATION OF ARCHAEOLOGICAL SITE STRUCTURE.

The late Upper Paleolithic site of Pincevent exhibits extraordinary preservation not only of artifacts, bones, and features, but also of their spatial distributions and relationships among items and features. Section 27 is a residential habitation unit, consisting of a large principal hearth which serves as a focal point for the organization of artifactual and faunal debris. A variety of mathematically based pattern recognition studies are applied to the distribution of faunal remains and are used in conjunction with ethnoarchaeological data for the interpretation of spatial patterning and site structure. These results yield information relevant to specific activities and overall site function.

Erickson, Clark L (Pennsylvania)

[111] BEFORE PUKARA AND TIWANAKU: EVIDENCE OF STATE FORMATION IN THE NORTHERN LAKE TITICACA BASIN OF PERU.

Despite a long period of scholarly interest in the state level societies of the Lake Titicaca Basin, there is very little archaeological information available for the important period immediately preceding the formation of the Pukara and Tiwanaku polities. In this paper, I summarize what is known about this important period of state formation, and I present recent data from excavations and archaeological survey conducted in the department of Puno with a focus on subsistence, community organization, settlement patterning, and socio-political structure in the northern Lake Titicaca Basin. The traditional chronological framework for this area is re-examined in light of this evidence.

Ericson, Jonathan (UCI Radiocarbon Lab) & Michael D Glascock (Missouri-Research Reactor)

[309] OBSIDIAN: FLOW DIFFERENTIATION BY INAA, COSO, CALIFORNIA.

Instrumental neutron activation analysis (INAA) of obsidian flow and dome samples of Coso Volcanic Field has been used to chemically differentiate five obsidian flow groups. INAA results in additional and more discreet chemical groups than x-ray fluorescence analysis. The Coso flow sources were widely used from coastal San Luis Obispo to San Diego counties. First use of these sources is reported to begin during the Pleistocene. Our INAA results will be useful for future obsidian hydration dating, exchange systems studies, and prehistoric quarry analysis.

Erkelens, Conrad & Melissa Kirkendall (Hawai'i-Manoa)

[307] HAWAIIAN PREDATION AND IMPACT ON THE SHELLFISH OF NU'ALOLO KAI, KAU'A'I, HAWAII.

An isolated rockshelter on the north coast of the island of Kaua'i in the Hawaiian Islands has provided a well preserved and deeply stratified deposit of marine shellfish and other remains of human occupation. Radiocarbon dates indicate continuous occupation in this valley for the last 800 years. Our analysis of the marine deposits documents the subsistence changes in shellfish exploitation and the impacts of human predation on shellfish in this small valley's bounded ecosystem.

Erlandson, Jon M (see Haggarty, James C) [702]

Evett, Daniel

[108] NEOLITHIC LIMITS OF GROWTH? THE CASE FROM THE TAVOLIERE (PUGLIA), SOUTHEASTERN ITALY.

This paper explores whether the early Neolithic mixed farming populations of the Tavoliere set in motion processes which reduced the productive capacity of the landscape that lifeways, settlements, and the region were abandoned by the end of the Middle Neolithic. As part of this inquiry, the paper compares two methods (a simulation and a data based approach) for assessing the ecosystem dynamics of early agriculturalists. Finally, the long term viability of prehistoric mixed farming economies is considered.

Ezzo, Joseph (see Price, T Douglas) [210]

Faber Morse, Birgit

[503] LATE CERAMIC AGE MANIFESTATIONS IN ST CROIX, VIRGIN ISLANDS.

Artifacts belonging to the Elenan (AD 600-1200) and Chican Ostionoid (AD 1200-1500) subseries from two large and well provenanced Cruzan collections are analyzed and compared with current archaeological research findings in St Croix and nearby islands. Site density and settlement pattern variability from later ceramic periods are compared with the earlier Saladoid occupations. Evidence of the easternmost ball and dance court in the Caribbean has been established at the Salt River site on St Croix. Its relationship to the complex Taino chiefdoms in neighboring Puerto Rico is discussed.

Farizy, Catherine (CNRS)

[103] MIDDLE PALEOLITHIC SPATIAL ORGANIZATION: QUESTIONS AND ANSWERS.

French open air sites older than the Upper Paleolithic are not numerous; those that were excavated over large areas are dramatically rare. Few are yet published, and their spatial organization is poorly documented. We can, however, discuss the nature of the questions that occur with any consideration of spatial analysis, and their implication for these older contexts. These are particularly useful directions to pursue when attempting to use open air sites to understand the organization of archaeological occupation levels from other contexts.

Fash, Barbara (see Hamilton, Rachel J) [209]

Faulkner, Charles H (Tennessee)

[104] SLAVERY IN KNOXVILLE, TENNESSEE: IN BUT NOT ENTIRELY OF THE SOUTH.

Distinctive patterns in slavery developed in southern towns and cities during the 19th century. Social and economic patterns included mixed neighborhoods of master and slave, slaves being hired and living out, and their association with free blacks, all of which affected the post-bellum residential patterns of urban blacks. For a southern town, Knoxville, Tennessee, was unique in its politics, economy, and number of black residents. Through a study of documents and archaeology, this paper attempts to determine how Knoxville's distinct character influenced the patterns of slavery and its aftermath within its boundaries.

Feinman, Gary M & Linda M Nicholas (Wisconsin-Madison)

[306] SHELL ORNAMENT MANUFACTURE IN EJUTLA: IMPLICATIONS FOR COASTAL-HIGHLAND INTERACTION.

The emergence of marine shell ornament production in Ejutla indicates an important shift in the nature of interactions between the Pacific Coast and the Central Valleys of Oaxaca during the Terminal Formative-Early Classic period. At this time, a diversity of Pacific shell species was transported to Ejutla where they were reduced through a range of technologies from whole shells to beads, pendants, and bracelets. Implications from these findings are discussed in the context of Monte Albán expansion and the importance of coastal-highland relations in ancient Mesoamerica.

Feinman, Gary M (see Nicholas, Linda M) [107]

Ferguson, T J (New Mexico)

[304] STRUCTURAL CHANGE IN HISTORIC ZUNI ARCHITECTURE AND SOCIETY.

An archaeological explanation of social change must be predicated on (1) objective demonstration of measurable differences in the archaeological record, and (2) a theoretical description of the causes and processes that produced that change in material culture. Techniques of graph analysis are used to measure change in the structure of historic Zuni village plans in terms of connectivity and permeability. Changes in architecture are related to social change using a "social logic of space" model reliant on Durkheimian notions of integration and segregation. Historical and ethnographic data are used to independently evaluate the results.

Ferring, Reid (North Texas)

[211] ALLUVIAL GEOLOGY AND MOUSTERIAN ARCHAEOLOGY IN CENTRAL PORTUGAL.

Recent geoarchaeological investigations in the Portuguese Estremadura have resulted in the discovery and test excavations at two *in situ* Mousterian sites. Sedimentological, pedogenic, and geomorphic data provide new evidence of late Pleistocene paleoenvironments as well as information on site formation processes. Initial analyses of lithic assemblages indicate differences in raw material procurement and lithic technology for this poorly known time period in western Iberia.

Fiedel, Stuart J (Ebasco Environmental)

[512] PROTO-ALGONQUIAN EXPANSION: LINGUISTIC AND ARCHAEOLOGICAL MODELS.

Linguistic evidence shows that the Proto-Algonquians originated in southern Ontario. Expansion from this homeland, and divergence of Algonquian-speakers into separate Central and Eastern branches, probably occurred between 500 BC and AD 800. Northern Iroquoian intrusion probably

exacerbated this process. Early and Late Point Peninsula horizons are possible archaeological correlates of the hypothesized population movements. Technological (bow and arrow), social (ranking and exchange systems), and adaptive factors may have facilitated Algonquian expansion.

Figueroa, María José & Débora M Kligmann (Buenos Aires)

[212] SITE FORMATION PROCESSES IN SHELL MIDDENS FROM TIERRA DEL FUEGO, ARGENTINA.

In Tierra del Fuego, midden sites on the Beagle Channel share several common features—site distribution is high and shell refuse is densely aggregated with clearly defined limits. Many sites have superimposed layers distinguished by coloring, texture, and faunal composition. These traditionally have been interpreted as different occupations but could also correspond to activities arising from the same event. A model based on artifact reassemblage, debitage analysis, and invertebrate faunal composition is used to define these deposition units and is useful for understanding localities with more complex sites.

Finney, Fred A (Iowa State Archaeologist Office)

[509] A RE-APPRAISAL OF ECONOMIC INTERPRETATIONS FOR CAHOKIA'S NORTHERN HINTERLAND.

Several recent papers have discussed the evidence for economic control and/or centralization in Cahokia's northern hinterland. Various authors have presented arguments for the presence of economic control and/or centralization, while others are against this position. This paper reviews these arguments and perspectives. It also presents one example of intra-site distributional evidence for the production of local products and the consumption of nonlocal exotic items in a Late Woodland and Middle Mississippian setting. This example contributes new data and perspectives on the economic organization of Cahokia's northern hinterland.

Finsten, Laura (McMaster)

[206] THE MIXTEC SIERRA: A CHANGING PERIPHERY.

The systematic survey of 850 km² of mountains between the Valleys of Oaxaca and Nochixtlan yielded evidence of numerous and widespread prehispanic settlements. This zone, in some periods, contained the boundary between Zapotec and Mixtec language and culture. Settlement pattern and other data are analyzed to examine frontier relationships and to compare core/periphery relationships in the Classic and Postclassic periods.

Fish, Suzanne K & Paul R Fish (Arizona State Museum)

[403] HOW COMPLEX WERE THE SOUTHWESTERN GREAT TOWNS' POLITIES?

Settlement patterns provide objective measures of aspects of complexity in southwestern great town polities that are expressed in territorial attributes and organization. During successive time intervals, a number of these attributes and their articulation are compared among regions for which sufficiently complete settlement information is available. Modalities and trends within the upland regions of the northern Southwest and the low desert basins of the south are established. Finally, expressions of territorial complexity are compared between these two broad geographic divisions.

Fish, Paul R (see Nelson, Ben A) [210]

Fish, Paul R (see Fish, Suzanne K) [403]

Fitzgerald, William

[1] NEUTRAL IROQUOIAN TRANSFORMATION: AD 1450-1650.

Contemporary accounts are largely mute on what caused the seemingly rapid transformation of the Neutral Iroquoians of southern Ontario from a dynamic cultural entity to one relegated to historical obscurity. The Iroquoian conquest between AD 1647 and 1651 terminated this distinctive culture; the cumulative effects of geographical location, environment, and human events that had earlier molded Neutral culture also were ultimately responsible for its demise. Archaeologically derived trends in material culture, settlement patterning, inter-regional interaction, and subsistence pursuits are evaluated in light of cultural evolution, foreign influences (native and European), for a society living in a transitional biotic zone during a period of climatic deterioration.

Fitzhugh, William W (Smithsonian)

[513] CULTURE CONTACT IN THE ARCTIC: IMPACT OF THE FROBISHER VOYAGES ON INUIT CULTURE.

The Frobisher voyages (1576-78) provide an unexplored venue for interdisciplinary studies of early European-Inuit contact. This paper reviews historical records in the light of recent archaeological research at both the Frobisher site and Inuit sites in Frobisher Bay. Data suggest a contact sequence of (1) initial exchange and barter, (2) mutual hostility and hostage taking, and (3) post-contact scavenging and utilization. The Frobisher voyages supplied East Baffin Inuit with European materials for

nearly three hundred years until European whaling began in Davis Strait in the late 19th century. Hence the dominant effect of Frobisher contact was post-contact and utilitarian. This pattern is compared with contact scenarios in Greenland, Labrador, and the North Pacific.

Flegenheimer, Nora (Conicet)

[212] PALEOINDIAN OCCUPATIONS IN THE ARGENTINE PAMPAS: A CASE FOR INTERSITE VARIABILITY.

Early assemblages recovered at Co. La China and Co. El Sombrero, dated in 10,000-11,000 yr BP and including Fishtail or Fell's Cave Stemmed projectile points, are analysed. Great diversity is registered in the lithic production stages present at the sites, as well as in the percentages of bifacial and bipolar flaking, tool types, and raw materials. Explanations proposed deal with localization of raw material sources, site function, and characteristics of the technological organization. The assessment of variability within the system is considered important for establishing correlations with other Paleoindian sites.

Forney, Sandra (US Forest Service) [Workshop 401]

Fosberg, Stephen (see Gerow, Peggy) [502]

Fowler, William R (Vanderbilt) & Dean Lambert (Texas-Austin)

[610] THE SOCIAL CONTEXT OF SIXTEENTH-CENTURY CACAO PRODUCTION IN IZALCO, EL SALVADOR.

Izalco is known historically as the richest cacao-producing region of colonial Guatemala. Data from 16th-century tribute records, censuses, and other legal documents and ethnobotanical field studies on modern cacao production in the region illuminate the social context of cacao production in Izalco in the early colonial period. These observations are combined with archaeological data to construct a model of the social context of Izalco cacao production at the time of the conquest.

Fowler, William R (Vanderbilt) [Discussant 105]

Francis, Julie (Wyoming State Archaeologist Office)

[303] CATION-RATIO DATING AND CHRONOLOGICAL VARIATION WITHIN DINWOODY STYLE ROCK ART IN NORTHWESTERN WYOMING.

Dinwoody style rock art in northwestern Wyoming is best known for large, complex interior line human figures. This style is spatially restricted to the Wind River and lower one-third of the Bighorn River drainage system, and figures were manufactured over a several thousand year interval from Archaic to Protohistoric times. Analysis of several sites shows that the supernatural-appearing human figures can be classified into multiple types. Cation-ratio dating is used to examine chronological variation in the manufacture of these types and to offer initial hypotheses regarding the evolution of Dinwoody anthropomorphs.

Franco, Nora Viviana (Conicet) & Flavia Carballo Marina (Universidad Federal de la Patagonia Austral)

[212] VARIABILITY OF SCRAPERS IN THE LAKE ARGENTINO AREA (SANTA CRUZ PROVINCE, ARGENTINE REPUBLIC).

The objective of this paper is to compare the lithic assemblage collected at Estancia Bon Accord Site 1 with collections from the upper Santa Cruz Basin which were obtained in transects, concentrations, and sites. The higher percentage of instruments and high ratio of side scrapers versus other categories of artifacts clearly separate Site 1 from the rest of the archaeological occurrences in the Santa Cruz Basin. In addition, the sidescrapers collected at Site 1 display distinctive properties. Functional interpretations are discussed in relation to the availability of raw materials, and its relevance for Patagonian archaeology is analyzed.

Franke, Judith A (Illinois State Museum)

[406] PUBLIC PROGRAMS AND PUBLIC CONTROVERSY AT DICKSON MOUNDS.

In January 1990, the 63-year-old public display of human skeletal remains in a Mississippian cemetery at Dickson Mounds Museum became central to a public controversy that came to involve museum personnel, local residents, politicians, Native Americans, archaeologists, and the general public, and attracted much media attention. The lengthy controversy affected every aspect of museum operations, including short- and long-term planning, as well as the quality, character, and overall objectives of exhibits, public programming, and archaeological site interpretation.

Frankenberg, Susan R (GAI Consultants)

[104] IMPLICATIONS OF SLAVE DEMOGRAPHY FOR HISTORICAL ARCHAEOLOGY IN THE UPPER SOUTH.

Many antebellum sites of the Upper South fall outside traditional definitions of plantations. These sites represent a historical phenomenon that served to set the South apart from the rest of the nation.

This paper presents a demographic analysis of late antebellum white, slave, and free black populations in areas of Tennessee and Kentucky in order to generate expectations about slaveholding and site structure in part of the Upper South. The goal is to contribute to region-specific, temporally sensitive models of slaveholding and agriculture.

Freidel, David (Southern Methodist) [Discussant 706]

Fremont, Donna (see Callaghan, Richard T) [415]

Freter, AnnCorinne (Ohio)

[602] A METHODOLOGICAL SUMMARY OF THE REGIONAL SETTLEMENT SURVEY AND OBSIDIAN HYDRATION DATING PROJECTS AT COPAN, HONDURAS.

The methods employed during the PAC Phase II regional settlement survey and accompanying test excavation projects are detailed. Following this, the history, design, and methods used in the Copan obsidian hydration dating project are discussed and the resultant chronological implications presented.

Freter, AnnCorinne (see Paine, Richard R) [209]

Friedin, Nicholas (see Brashler, Janet G) [710]

Friedman, Ed (Bureau of Reclamation) & Christopher Judge (Diachronic Research Foundation)

[106] PRACTICUM: ARCHAEOLOGY IN THE SOCIAL STUDIES CURRICULUM.

For the past three summers the University of South Carolina has offered a course entitled: South Carolina Classroom Archaeology: Summer Institute for Social Studies Teachers. This graduate level course is a nine-day intensive workshop incorporating lectures, slide presentations, video film, and multi-sensory experiences such as replicating aboriginal technologies and visits to sites, which result in a non-traditional learning format. Participants learn first hand knowledge from the top scholars in the state, then prepare teaching modules based on the information. Practicum participants work with a small portion of the curriculum through a participatory experience.

Friesen, Max (McGill)

[513] ARCHAEOLOGICAL APPROACHES TO INTERSOCIETAL CONTACT: INUVIALUIT-EUROAMERICAN INTERACTION ON HERSCHEL ISLAND, YUKON TERRITORY

The past decade has seen increasing academic interest in the interaction between colonists and the indigenous peoples encountered during expansion of the European world-system. Analyses of the internal dynamics of non-literate societies prior to and during early phases of contact must rely primarily on archaeological data. This paper explores the nature and meaning of one instance of interaction through analysis of material culture from an early historic Inuvialuit (Eskimo) sod house on Herschel Island, Yukon Territory.

Frison, George (Wyoming) [Discussant 303]

Fritz, Gayle J (Washington-St Louis) [Introduction 402]

Fry, Robert E (Purdue)

[411] CERAMICS AND THE EVOLUTION OF RITUAL: A LOWLAND MAYA CASE STUDY.

Most studies of change in productive systems with emerging social complexity concentrate on changes in the organization of production. In this study I examine the relationship between the emergence of complex societies in the Maya Lowlands and the appearance and evolution of specialized ceramic ritual wares. The changing nature of Lowland Maya rituals is mirrored in the first appearance and diversification of ritual vessels, cache vessels, and *incensarios*. Similarities in rituals across regions give us clues concerning the nature of interregional relationships.

Frye, Lori A (Archaeological Services Consultants) & John P Nass Jr (California-Pennsylvania)

[409] SEBRING POTTERY: MANUFACTURING TECHNOLOGY AND THE STYLISTIC DIVERSITY OF YELLOW WARE PRODUCTION.

Sebring Pottery began operations in 1863 and continued through 1912. Very little is known about the operations of early commercial potteries such as Sebring Pottery. This pottery originally produced yellow ware ceramics, but switched to whiteware and then porcelain as consumer preferences changed. The changes in ware production generally coincided with improvements in the manufacturing technology and expansion of the factory. This paper focuses on the pottery manufacturing technology and the stylistic diversity of the wares from 1863 to 1864 when yellow ware was produced. Technology includes information on architectural features, manufacturing methods, and manufacturing defects.

Frye, Lori A (see Sprague, Rae) [409]

Frye, Susan W (National Park Service)

[606] INDUSTRY IN THE WILDERNESS: THE DEVELOPMENT OF IRONMAKING IN THE GREAT VALLEY OF MARYLAND.

In 1761, four Baltimore merchants erected a small ironworks, Antietam Furnace, in the newly settled Great Valley of Maryland. Unusually intact archaeological deposits, combined with a short 15-year span of operation, make this furnace site a "time capsule" of ironmaking technology and development during the latter half of the 18th century. The central premise of this paper is that the unusual size and configuration of the smelting complex at Antietam represents a tentative response to a challenging frontier environment. Its demise represents part of the transition from a preindustrial emphasis on local markets to one involving a larger market economy.

Fryman, Robert J (Kent State)

[409] EVALUATION OF THE HOME LOT CONCEPT AS A MEANS TO STUDY HOUSEHOLDS.

Excavations conducted on two 19th-century domestic compounds associated with common pottery workers in East Liverpool, Ohio, recovered large quantities of domestic refuse felt to be indicative of household status. The analysis of both the material culture and extant historical documents afforded an opportunity to examine views of the household as it relates to working class families. Comparison with data obtained from temporally similar household units provides a means to evaluate archaeological concepts of the household.

Fuess, Martin T & Jack Donahue (Pittsburgh)

[503] POST-SALADOID AGE POTTERY IN THE NORTHERN LESSER ANTILLES: LESSONS LEARNED FROM THIN SECTION PETROGRAPHY.

Petrographic analysis of inclusions in post-Saladoid sherd thin sections from five islands in the northern Lesser Antilles allows a number of conclusions to be drawn. Volcanic bedrock islands (Montserrat and St Martins) consistently have ceramics with volcanic inclusions. In contrast, carbonate or limestone islands (Anguilla and Barbuda) have pottery with either volcanic inclusions or grog and carbonate inclusions. The former were brought from other islands while the latter were probably produced on the island. Pottery from Antigua, with both carbonate and volcanic bedrock, also contains both inclusion categories.

Fuller, Richard S (see Brown, Ian W) [310]

Gaertner, Linda M (Wisconsin-Madison)

[412] USE-WEAR TRACES ON EARLY ARCHAIC DALTON ADZES FROM NORTHEAST ARKANSAS.

Fifteen Dalton adzes (c. 10,500-9500 BP) from northeast Arkansas were examined for use-wear traces mainly to test the proposed wood working function of these chert tools. High power (50-200x) incident light microscopy was used to compare use-wear traces on several experimental tools with traces on the Dalton adzes. The results implied that Dalton adzes were hafted with hide and used most often in heavy charred wood-working activities.

Gallin, Lenore (Diablo Valley)

[108] ARCHITECTURE OF THE NURAGHI TOWERS OF BRONZE AGE SARDINIA.

New information about the construction technology and organizational abilities of prehistoric Sardinian builders is emerging from data collected during five seasons of architectural investigation of the Nuraghi. Teams of archaeologists, architects, engineers, and surveyors studied 150 Bronze Age towers in west Sardinia. Aerial photography, electronic surveying, detailed analysis of solid/void relationships, and examination of stone masonry suggest development of construction formulas to deal with the statics of unreinforced masonry and a well defined geometry related to building style. The architectural similarity of Nuraghi over a wide area reflects strong cultural traditions, while stylistic variation may indicate age and function.

Garber, James F (Southwest Texas State)

[411] A POSSIBLE CYCLE 7 CARVED STELA FROM THE LOWLAND MAYA SITE OF BLACKMAN EDDY, BELIZE.

Investigations at the lowland Maya site of Blackman Eddy, Belize, revealed the presence of a stela carved in an early style. Its similarities to existing Cycle 7 inscriptions, and its dissimilarities to the earliest known lowland Maya carved stelae, support a proposed Late Preclassic date. Although the presence of non-standard features on the Blackman Eddy stela present problems in reading it as a Long Count inscription, a tentative suggestion of 7.10.10.0.0. (146 BC) is offered. Its presence in the Maya lowlands provides important clues to the origins and development of Maya hieroglyphic writing and calendric notation.

Garber, James F (see Driver, W David) [706]

*Gardner, Paul S***[402] THE CULTURAL AND ECOLOGICAL IMPLICATIONS OF NUT EXPLOITATION.**

The structure of prehistoric nut exploitation strategies remains poorly understood. This paper summarizes current information on the costs and benefits of nut exploitation. Rather than being a cornucopia of easily available nuts, the Eastern Woodlands forest may have provided only limited yields without human management. In the Archaic period, the management of localized stands, combined with the storage potential of nuts, would have mitigated the advantages of residential mobility. By favoring increased sedentism and the opening of the forest canopy, nut tree management would have added impetus to the creation of domestic localities and the exploitation of native weed plants.

*Garrow, Patrick H (Garrow & Associates)***[504] THE STATUS AND FUTURE OF URBAN ARCHAEOLOGY.**

This paper summarizes the status of urban archaeology and discusses the current research themes that are being explored on urban domestic sites. The paper focuses on the need for greater emphasis on household and neighborhood-related studies as means of better understanding the people of the city versus larger theoretical constructs that cannot really be understood from a lot, block, or even neighborhood study universe.

*Gear, Kathleen O'Neal (see Gear, Michael W) [414]**Gear, Michael W & Kathleen O'Neal Gear (Tor Books)***[414] WHEN SCIENCE AND FICTION MEET: POPULAR FICTION AS A VEHICLE FOR****PUBLIC AWARENESS AND EDUCATION.**

Public interest in archaeology has never been higher, and works of fiction are not only feeding this appetite, but are molding the American perception about archaeology, sites, and prehistoric peoples. Two bestselling authors discuss the powerful role of market fiction and elaborate on opportunities for public education and problems inherent in the work. A negative image of archaeology, archaeologists, and prehistoric peoples is currently portrayed by fiction authors without a background in archaeology—and here's what we can do about it.

*Gehrt, Robert (see Bond, Clell L) [702]**Geib, Phil R (Navajo Nation Archaeology) & Dale Davidson (BLM)***[205] ANASAZI ORIGINS: A PERSPECTIVE FROM PRELIMINARY WORK AT OLD MAN****CAVE.**

Resolving the question of Anasazi origins partially depends upon finding Basketmaker II antecedents. An essential place to search for antecedents is in the San Juan region of southeastern Utah where Basketmaker II remains were first discovered in the late 1800s, and where subsequent investigators have documented various aspects of Basketmaker lifeways. Old Man Cave, located along Cedar Mesa's northeast edge, sheds considerable light on the origins issue. Test excavations have revealed Basketmaker II remains above Archaic strata dating back to at least 7440 years BP. Test results are summarized, and their significance for the origins issue are highlighted.

*Gelburd, Diane E (Soil Conservation Service) [Introduction 601]**Geneste, Jean-Michel (Direction des Antiquités Préhistoriques d'Aquitaine)***[608] ON THE INTEGRATION OF TECHNICAL SYSTEMS DURING THE PALEOLITHIC.**

This paper presents a methodological consideration of the integration of different technical systems during the Paleolithic.

*Genheimer, Robert A (Cincinnati Museum of Natural History)***[302] THE STUBB'S CLUSTER: HOPEWELLIAN SITE DYNAMICS ALONG THE MIDDLE REACHES OF THE LITTLE MIAMI RIVER IN SOUTHWEST OHIO.**

Between 1979 and 1983, more than two dozen Middle Woodland sites were recorded along a broad bend of the Little Miami River in Warren County, Ohio, associated with the Stubb's Earthwork complex. In general, the larger denser sites were close to the earthworks, while those sites of greater distance or opposite the earthworks were noticeably smaller and lower in density. There was no evidence that any of the sites had served as agricultural communities, and it seems probable that intermittent/cyclical occupation and abandonment was occurring, perhaps as a function of ceremonial or socio-political activities.

*Gerow, Peggy (Archaeological & Historical Research Institute), LouAnn Jacobson & Stephen Fosberg (BLM)***[502] ARCHAEOLOGICAL INVESTIGATIONS AT FORT CRAIG, NEW MEXICO.**

Excavations conducted at Civil War era Fort Craig focused on questions regarding culture conflict, economics, and environmental adaptations. Throughout the 31 years of the fort's occupation, conflict

with Native Americans was a constant. Economic differences between personnel, dependence on the local economy, the effectiveness of the army in shipping supplies to isolated posts, and the role of the railroad were all significant factors in the fort's operation. Two seasons of field work have demonstrated that the archaeological site contains substantial information for answering the above research questions that is not available in the historical records.

*Gerstle, Andrea I (Western Michigan)***[105] THE STOREHOUSES OF CEREN.**

Storage facilities are an important component of all compounds in the well-preserved Classic period site of Joya de Cerén, El Salvador. Similarities and differences in the location, architecture, and contents of these facilities reveal some characteristics of household and community economics and social organization. These also provide a good comparative example for ethnographic interpretations and other archaeological reconstructions where preservation is not as good.

*Geselowitz, Michael (MIT) & Lane Beck (Harvard-Peabody)***[509] RANK-ORDERING OF GRAVE WEALTH: A PROTOHISTORICAL TEST CASE.**

Archaeologists seeking to determine social position from mortuary data often focus on relative cost of burial as a possible correlate to social rank. There are obvious difficulties in determining the original value of material found in burials; simple measures which are better for comparative purposes may mask the true complexity of the situation. Various cost-ranking schemes are analyzed using data from a cemetery where the relative exchange values of the different burial goods can be determined from historical records. From this test case we suggest that relatively simple archaeological schemes can work under appropriate conditions.

*Gibson, D Blair (California State)***[704] THE SOCIAL DIMENSIONS OF PREHISTORIC IRISH FIELDS: SOCIOECONOMIC TRANSFORMATIONS IN LAND USE IN BURREN OF COUNTY CLARE.**

Archaeological landscapes in the Burren region of County Clare date back to the Irish Early Bronze Age. These landscapes consist of conflated complexes of settlements, cemeteries, and field boundary wall systems of stone representing many periods of activity. Data from survey and excavation of selected sites paint a picture of starkly differing patterns of land use over a span of 2800 years—corresponding to changes in the economic potential of the Burren's land forms, and to changes in the degree to which the Burren's past inhabitants were socially integrated.

*Gifford, John (RSMAS-Miami)***[407] RECOVERY OF LATE HOLOCENE SEDIMENT SEQUENCES FROM CHETUMAL BAY, BELIZE.**

In May 1991 eight 3" diameter cores were recovered from two areas in western Chetumal Bay: (1) from the modern fishing village of Consejo north to the mouth of the Rio Hondo, and (2) between Cerros and the mouth of the New River. Sediment sequences up to 2.6 m long were located by hand probing and recovered by vibracoring. Cores from both areas exhibit a marine carbonate mud overlying a mangrove peat. Results of sedimentological analyses of these cores are discussed as they relate to local relative sea level rise in Chetumal Bay during the late Holocene.

*Gillespie, Susan D (Illinois-Urbana-Champaign)***[313] EXCAVATIONS AT AN OLMEC MONUMENT WORKSHOP.**

Recent excavations at Llano del Jicaro, Veracruz, have identified this site as a monument workshop for the nearby Olmec center of Laguna de los Cerros. At least ten unfinished monuments and worked boulders, two of them clearly in the Olmec style, were located in an area of a natural basalt flow. Surrounding the worked boulders were large flakes, basalt hammerstones, and tools made from an imported stone. Preliminary steps in the manufacture of carved stone monuments can be reconstructed from these data. A possible residential area for the stone carvers also was located.

*Gilman, Antonio (California State-Northridge)***[603] GERMANIC SOCIAL FORMATIONS IN EUROPE AND BEYOND.**

Bronze Age social formations in the Iberian Peninsula (and in some other regions of Europe) exhibit incipient class hierarchies, but lack the centralization that most ethnological syntheses attribute to 'chiefdoms.' They resemble, rather, the 'Germanic' societies well known in the ethnohistorical record of the periphery of Classical and Medieval Europe. An examination of the ethnographic record suggests that similar cases are widespread beyond Europe. This calls into question the general validity of the managerial accounts of incipient stratification that still dominate the anthropological literature.

Gilman, Antonio (California State-Northridge) [Discussant 704]

*Gilman, Patricia (Oklahoma)***[604] THE ARCHAIC TO EARLY CERAMIC TRANSITION IN SOUTHEASTERN ARIZONA.**

The amount of residential sedentism accompanying the transition from the Archaic to the early ceramic period in the prehistoric Southwest is a timely issue. In part, this is because the amount of sedentism may parallel the amount of agriculture being practiced, another issue important in explaining the transition. Recent survey in the San Simon drainage of southeastern Arizona has produced data on Middle and Late Archaic and early ceramic period settlement patterns. The presence of residential sites and land use seems to have been rather different during the Middle Archaic than during the later two periods.

*Gilpin, Dennis (Navajo Nation Archaeology)***[205] SALINA SPRINGS AND LUKACHUKAI: LATE ARCHAIC/EARLY BASKETMAKER HABITATION SITES IN THE CHINLE VALLEY, NORTHEASTERN ARIZONA.**

Sites in the Chinle Valley of northeastern Arizona provide evidence that Basketmaker subsistence and settlement characteristics—including maize horticulture, shallow pit dwellings, and storage pits—were widespread at least by the beginning of the first millennium BC. At Salina Springs, charcoal from a dwelling containing burned maize dated to 2810 F1 80 BP (Beta-26334). At Lukachukai, charcoal from a hearth containing burned maize dated to 3110 F1 90 BP (Beta-43317), and charcoal from a bell-shaped pit dated to 3040 F1 90 BP (Beta-43318). Maize, cheno-ams, other wild plants, artiodactyla, and rabbits appear to have formed the subsistence base.

*Glascock, Michael D (see Ericson, Jonathon) [309]**Glass, Stephen (Woodward-Clyde Consultants)***[502] A WILDERNESS STUDIES INSTITUTE ARCHAEOLOGICAL FIELD SCHOOL AT THE P-IV RUIN OF HUPOVI.**

The Wilderness Studies Institute (WSI) conducted fieldwork at the large P-IV adobe pueblo of Hupovi during the summers of 1990 and 1991 in north-central New Mexico. Field work conducted was designed to mitigate adverse effects that the site might suffer from a planned program of public interpretation. This paper explains how general members of the populace can be effectively utilized on research projects. Results of the program of surface collection and mapping are compared to nearby subsurface excavations at Howiri ruin. Analyses suggest that despite years of uncontrolled surface collecting, proportions of surface ceramics still closely mirror subsurface distributions.

*Glassow, Michael A (UC-Santa Barbara)***[702] PREHISTORY, SUBSISTENCE, AND SETTLEMENT ALONG THE CENTRAL CALIFORNIA COAST: CONTRACT ARCHAEOLOGY ON A SEGMENT OF VANDENBERG AIR FORCE BASE.**

Contract-funded research on southern Vandenberg Air Force Base occurred at sites dating from 9000 BP to the period of Spanish missionization. Research focused on evaluating an increasing dependence on marine food resources resulting from increasing population density and concomitant pressure on land resources. This model applies broadly to the prehistory of the region but environmental changes and difficulty of access to nearshore marine resources are significant complicating factors. Of interest are changes during the latest period of prehistory, when the diversity of settlement habitats increased and certain food resources began to be intensively harvested.

*Gleichman, Carol L (Advisory Council on Historic Preservation)***[101] ASSESSING INFORMATION NEEDS: DETERMINING WHEN AND WHERE AN ARCHAEOLOGICAL SURVEY IS NEEDED**

Before proceeding with an archaeological survey, federal agencies need to assess what is already known about historic properties within the project area, and to determine the most appropriate and cost effective methods for obtaining any additional information needed. Soliciting input from Native American tribes and local residents during early stages of planning can streamline the process. This paper explores methods for determining if, when, and where survey is needed, and examines situations where archaeological surveys are not necessary, despite the fact that significant archaeological sites are expected within the project area.

*Glumac, Petar D (Smithsonian)***[708] MODES OF PRODUCTION AND PATTERNS OF CONSUMPTION OF PRE-BRONZE AGE SOUTHEAST EUROPE.**

The social and economic context of pre-Bronze Age technologies in southeast Europe during the fifth and fourth millennia BC has been seen as being either a craft specialist system or a domestic mode of production. This paper presents archaeological evidence that argues for the domestic mode of production of metallurgy in the context of the Vinca culture. Contrasts are made in a review of

parallel data from studies of contemporary bone, ceramic, and lithic technologies. The relevance of the evidence for metallurgical production and consumption to recent literature regarding the domestic mode of production is discussed.

*Gnabasik, Virginia (Corps of Engineers)***[707] CATCHING THE MOUSE: FLOOD CONTROL ARCHAEOLOGY ALONG THE SOURIS RIVER IN NORTH DAKOTA.**

Since 1974, the Corps of Engineers has been conducting cultural resource investigations in connection with flood control projects along the Souris River. Surveys and limited testing suggest changing occupational patterns in the Souris Valley from Paleoindian to Historic times. Variations in site location preference between the upper and lower portions of the Souris River loop in North Dakota are detailed. Use of the Souris Valley as a travel corridor between the Assiniboine and Missouri is discussed.

*Goland, Carol (see Winterhalder, Bruce) [402]**Goldman, Nurit (see Bettis, E Arthur) [607]**Goldstein, Lynne (Wisconsin-Milwaukee)***[202] REBURIAL IN PRACTICE: THE TRANSFORMATION OF THE CASE-BY-CASE APPROACH.**

Archaeologists (and many Indians) promoted a case-by-case approach to reburial laws, or careful consideration of the unique qualities and circumstances of each case. This was thought necessary if we truly wanted to respect the wishes of tribes or nations. Now that legislation is largely in place, it is useful to see how the idea of case-by-case has been put into practice. It appears we have replaced our old methods of operation with new sets of rules that have trouble accommodating the case-by-case approach. The potential consequences of this situation is examined.

*Goldstein, Paul (Southern Peru Copper Corporation)***[405] TIWANAKU STATE SETTLEMENT OF THE AZAPA AND MOQUEGUA VALLEYS: A PRELIMINARY COMPARISON.**

Initial survey and examination of Tiwanaku settlement patterns in the Azapa Valley of northern Chile suggest altiplano state suzerainty over ethnically distinct indigenous peoples. This differs radically from the colonization and full incorporation into the Tiwanaku state system that previous work has demonstrated for Peru's Moquegua Valley between AD 500 and 1000. Settlement pattern, material culture, and domestic and monumental architecture are used to contrast the patterns of regional diversity and state hegemony that prevailed in both areas.

*Gonlin, Nancy (Penn State)***[209] TEST-PIT HEAVEN: WHEN THE SAMPLE REPRESENTS THE POPULATION.**

Numerous projects use test-pitting to help understand the chronology and function of sites and to reconstruct the settlement system of a region. At Copan, Honduras, an empirical check of this methodology is possible for the rural area. Six sites were tested and then later completely excavated, allowing for an analysis from sample to population. In most cases, the test-pitting data are highly representative of site function and chronology, thus supporting the reconstruction of the Late Classic Copan settlement system from the test-pit survey.

*Goodby, Robert G (Brown)***[705] PROCESSUALISM, POST-PROCESSUALISM, AND CULTURAL RESOURCE MANAGEMENT IN NEW ENGLAND.**

Cultural resource management and processual archaeology have dominated the study of New England's prehistory since the 1970s. In becoming the dominant approach to the study of prehistory, the processual approach to cultural resource management systematically excluded from consideration questions of meaning, ideology, history, and individual action in the past of Native Americans. This situation persists at a time in which processual archaeology is under increasing criticism in academic circles. The consequences of this situation are considered, and specific strategies are suggested to make cultural resource management studies more amenable to emerging "post-processual" alternatives to the study of prehistory.

*Goodyear, Albert C (South Carolina)***[611] GEOARCHAEOLOGICAL CRITERIA FOR THE STRATIGRAPHIC RECOGNITION OF THE PLEISTOCENE-HOLOCENE BOUNDARY IN ALLUVIAL CONTEXTS IN THE SOUTHEASTERN US.**

Based on the past two decades of georegional field studies, it is clear that floodplains were the most dynamic situations for both deposition and erosion during the 11,500 to 10,000 BP interval.

Geological and pedological studies at Paleoindian sites show a sedimentological and pedological pattern which reoccurs in the southern Appalachians. Evidently, the Pleistocene-Holocene stratigraphic boundary is marked by channel-related sands overlying eroded B-horizon paleosols. In the clearest cases, post-Clovis lanceolate points are contained within the first pulse of Holocene alluvium, suggesting that deposition did not begin until sometime during the 11th millennium BP.

Gordon, Elizabeth A & Terry L Hunt (Hawai'i)

[307] SHIFTING PARADIGMS AND SUBSISTENCE CHANGE IN OCEANIA: A HISTORICAL CRITIQUE.

This paper provides a historical and critical review of studies of subsistence change in Oceania. We show that the changing goals of archaeological research are reflected not only in methodological concerns, but in the kinds of conclusions reached. Early researchers were preoccupied with origins and migrations, and showed little interest in subsistence. Later cultural evolutionary assumptions led others to see "neolithic revolutions" in many island cases. Recent years have witnessed a growing sophistication with issues of recovery, quantification, and comparability. New research and re-analysis challenge some conventional models of subsistence change.

Grant, Annie (see Barker, Graeme) [108]

Graves, James R (see Stothers, David M) [512]

Graybill, Jeffrey R (GAI Consultants)

[204] THE SHENKS FERRY TRADITION: LATE WOODLAND SETTLEMENT CHANGE IN SOUTHEAST PENNSYLVANIA.

The Shenks Ferry tradition dates to AD 1250-1550. Based upon an analysis of the Shenks Ferry settlement record, three broad historical trends emerge: (1) a decrease in the size of the inhabited territories, not sustaining territories; (2) an increase in the size of villages; and (3) a decrease in village numbers. These settlement changes exhibit clear parallels to cultural systems reported for other parts of mid-latitude eastern North America at this time. The rationale for these settlement trends within a larger framework of environmental, demographic, and other change is discussed.

Grayson, Donald K (Washington) [Discussant 307]

Greber, N'omi (Cleveland Museum of Natural History)

[302] THE SEIP GEOMETRIC ENCLOSURES AND ENVIRONS: AN ESTIMATE OF POSSIBLE CHANGES IN COMMUNITY PATTERNS THROUGH TIME.

A very important part of the settlement pattern of Ohio Hopewell peoples is designated by the remains of extensive earthen and stone walls that apparently mark special areas within the landscape. Patterns of the variations in the plan forms, the topographic locations, and environmental features found in the areas of the major earthworks are briefly discussed. Within this background, an example of possible changes through time in the use of the earthwork area as part of local and regional Hopewell community patterns in Ross County is presented for the Seip Group.

Green, William (South Carolina)

[310] A CRITICAL EVALUATION OF THE SIXTEENTH-CENTURY SPREAD OF DISEASE IN THE INTERIOR SOUTHEAST.

Anthropologists have argued that following contact, pandemics spread rapidly throughout the southeastern United States, causing a massive collapse of Native American populations. Recently, however, there has been a growing dissatisfaction with this model, and a number of historians and anthropologists have begun to raise questions concerning its validity. A critical examination of the historical, bio-archaeological, and epidemiological data reveals that there is little evidence to support a model of disease-induced depopulation, and that competing models taking into account political cycling, trade, and missionization offer better explanations for the collapse of the southeastern chiefdoms.

Green, William (Iowa)

[607] THE WEAVER RING-MIDDEN COMMUNITY AT GAST FARM (13LA12): AN EXAMPLE OF A PAN-MIDWESTERN EARLY LATE WOODLAND VILLAGE ORGANIZATION PATTERN.

This paper reviews the evidence for Weaver (Early Late Woodland) community patterning at the Gast Farm site, southeastern Iowa, based on aerial photos, controlled surface collections, and excavations. The 1.25 ha community consisted of a "ring-midden" of structures, features, and activity areas surrounding a circular central plaza. This is the first report of a Late Woodland ring midden west of the Mississippi River, but similar, contemporary community forms have been identified elsewhere

in the Midwest. These villages are viewed as egalitarian and generally sedentary, reflecting greater domestic nucleation compared with Middle Woodland communities in many regions.

Greenlee, Diana (Washington)

[309] INVESTIGATING DIAGENETIC ALTERATIONS IN PREHISTORIC BONE USING ELECTRON MICROBEAM ANALYSIS.

Compositional analyses of archaeological bone are frequently used in dietary reconstruction and/or dating. Clearly, understanding the diagenetic processes that can alter bone composition is critical for these applications. Electron microprobe analysis has proven useful in identifying elemental concentration gradients across bone cross-sections. This poster presents the results of a slightly different approach, combining SEM imaging and electron microprobe analysis to examine the chemical composition of individual crystalline structures in bone from a range of depositional environments.

Gremillion, Kristen J (Ohio State)

[402] NEW PERSPECTIVES ON THE PALEOETHNOBOTANY OF THE NEWT KASH SHELTER.

The Newt Kash rockshelter generated much of the original seedstock for the model of early and independent agricultural origins in the Eastern Woodlands of North America that has only recently earned wide acceptance. Recent reexamination of material from Newt Kash employing modern methods of analysis and quantification has greatly enhanced the empirical basis for many initial interpretations. In conjunction with new evidence from a variety of sources, these studies have contributed towards ongoing revision of the chronology and ecological context of the initial development of plant husbandry in eastern North America.

Griffin, James B (Smithsonian)

[615] AN OUTSIDER'S VIEW OF THE WPA.

The relief labor program devoted to archaeological research from 1933 to about 1941 resulted in major contributions to American prehistory. It provided employment for large numbers of workers directed by the first large group of college-trained field and laboratory personnel. It revolutionized knowledge of eastern United States archaeology and added major new data bases to many other areas. It provided the cultural-historical foundation for new research directions in the 1960s and 1970s.

Griffin, James B (Smithsonian) [Discussant 1]

Griffin, James B (Smithsonian) [Discussant 102]

Griffin, James B (Smithsonian) [Discussant 302]

Griffiths, Janet (Colorado-Boulder)

[314] MODIFIED BONE AND BONE TOOL USE ON THE SOUTHERN PLAINS: AN EXAMPLE FROM WEST CENTRAL TEXAS.

Excavations at Site 42RN169 revealed evidence of a Late Prehistoric bison processing station. Rapid burial during flooding episodes limited post-depositional disturbance and left *in situ* artifacts associated with well defined activity areas and features. Remains of bison, deer, and smaller mammals were recovered. Among features recorded were three peg features of vertical bison ribs, including a ring of 10 ribs driven into the ground. Formal and informal bone tools were present; use-wear is examined. Excellent site preservation, unusual features, and variety of bone tools provide insight into subsistence in the Southern Plains.

Grove, David C (Illinois-Urbana-Champaign)

[313] THE 1991 LA ISLA, VERACRUZ, OLMEC PROJECT.

The site of La Isla, Veracruz, is situated 12 km north of the Gulf Coast Olmec center of Laguna de los Cerros. 1991 research at La Isla was devoted to gaining data on the community structure, domestic organization, and subsistence at this village-level Olmec settlement. The La Isla excavations are discussed, along with observations on Laguna de los Cerros and its hinterland, and new Olmec monument discoveries.

Guevin, Bryan

[707] PALEOGEOGRAPHY AND ABORIGINAL SETTLEMENT WITHIN THE LOWER GUADALUPE RIVER/SAN ANTONIO BAY REGION OF THE CENTRAL TEXAS COAST.

Archaeological investigations for maintenance dredging along the Victoria Barge Canal were conducted in 1989 for the Corps of Engineers. While investigations focused on surveying and testing sites for National Register significance, a unique opportunity for post-data recovery investigations at seven sites affected by barge canal construction in the late 1950s was provided. Artifact analyses (including the application of the type-variety system of ceramic classification), along with radiocarbon dating and examination of faunal remains, were utilized in assessing overall concomitant relationships.

between aboriginal settlement and paleo-environmental changes throughout the lower Guadalupe River Valley.

Gundy, Barbara J (see Carlisle, Ronald C) [409]

Haag, William G (Louisiana State)

[615] BEGINNINGS OF FEDERAL AID TO ARCHAEOLOGY.

It was coincidence in American history that brought archaeology, Works Progress Administration (WPA), and the Tennessee Valley Authority (TVA) together. In 1933 the depressed economic conditions of the country were being countered by large scale government financed construction projects. The mission of TVA was to construct a series of approximately fifty hydroelectric dams on the Tennessee River and its tributaries. In 1934 it was mandated that archaeological sites be explored before waters were impounded. Because the WPA bureaucratic superstructure was so undeveloped our initial relations were very good.

Hadingham, Evan (NOVA-WGBH)

[301] THE LANGUAGE OF THE MEGALITHS.

A general discussion of interpretations of European prehistoric ritual art and monuments and how they have often served distinctly 20th century viewpoints and preoccupations is presented. Do the megaliths and Neolithic art motifs "speak" to us directly, as researchers such as the Thoms and Gimbutas seem to assume, or do we tend to manipulate them into a "language" or exotic landscape of our own making?

Haggarty, James C (Shoreline Archaeological Service), Christopher Wooley (Chumis Cultural Resource Service) & Jon M Erlanson (Oregon)

[702] EXXON'S CULTURAL RESOURCE PROGRAM: THE PROCESS AND RESULTS OF SITE PROTECTION IN PRINCE WILLIAM SOUND AND THE GULF OF ALASKA.

Exxon Company, USA, in compliance with state and federal historic preservation law, funded a major site protection program in Prince William Sound and the Gulf of Alaska in response to the grounding of the TV Exxon Valdez on March 24, 1989. With the assistance of the Alaska State Historic Preservation Officer, Coast Guard, Forest Service, National Park Service, Fish and Wildlife Service, Chugach Alaska Corporation, and the Kodiak Area Native Association, the three year program identified sites, determined the effect of planned treatment on cultural resources, and mitigated impacts to sites in the spill area during the shoreline treatment. Archaeological data collected and synthesized contributed substantially to an understanding of the Alutiiq region.

Hagstrum, Melissa (see Deal, L Michael) [703]

Hajic, Ed [Discussant 707]

Haley, Harold (Baylor) & Thoric Cederstrom (Arizona)

[411] MAPA METLAZOYUCA: FIELD SURVEY AND ETHNOGRAPHIC PROVENIENCE.

Mapa Metlatoyuca is an early colonial Mexican lienzo attributed to northern Puebla. Analysis of its place signs and personal names suggested a Mixtec provenience in northern Oaxaca. Comparisons of modern topographic maps with river pattern on the lienzo suggested Tlapiltepec in the Coixtlahuaca Valley as the site. Survey and photographs of Tlapiltepec confirm river and roads similar to those on the lienzo. At the location of a pyramid temple on the lienzo, there is an early Dominican church. Ethnographic lienzo, modern maps, and field survey give strong evidence locating this lienzo in Tlapiltepec.

Haley, Shawn (Red Deer) & Lynn M Malinowski (Argonne National Lab)

[210] COOPERATIVE CONSERVATION ARCHAEOLOGY, MANTI-LASAL NATIONAL FOREST, UTAH.

In the American Southwest, construction activities and looting of archaeological sites are severely affecting the prehistoric resources of that area. In a joint effort to reduce the impact of looting, in particular on the Anasazi sites in the Manti-LaSal Forest of southeastern Utah, the Sierra Club and the US Forest Service have created a unique "Inventory and Protection" project. Going into its fourth year, the project has amassed a significant data base that already has contributed considerably to the understanding of Anasazi settlement patterns. In addition, the project has become a model for conservation archaeologists across the Southwest.

Hall, Thomas D (DePauw) & Christopher Chase-Dunn (Johns Hopkins)

[206] WORLD-SYSTEMS IN PREHISTORY.

This paper outlines a theoretical approach to the comparative study of world-systems small and large, and explores the particular issues of conceptualization and theory construction which are raised

by the analysis of prehistoric intersocietal systems. How should such regional interaction networks be conceptualized and empirically bounded? What kinds of processes are of particular interest from the perspective of comparative world-systems? How can the study of prehistoric systems contribute to a general theory of social development?

Hamilton, Nathan (Southern Maine)

[614] PREHISTORIC MARITIME FISHING STRATEGIES IN CASCO BAY, MAINE.

Fish remains from eight prehistoric sites situated on coastal island and mainland settings are compared for Casco Bay, Gulf of Maine. Detailed study of marine fish remains from stratified Archaic and Ceramic period contexts includes fourteen species represented by ca 25,000 specimens. Diagnostic cultural remains are combined with 30 radiocarbon dates to establish temporal changes in species usage and seasonal procurement of various marine fishes. The seasonal nature of exploitation is reconstructed through study of otolith growth patterns. The maritime nature of the fishing subsistence pattern is correlated with Archaic and Ceramic period sites elsewhere in the Gulf of Maine.

Hamilton, Rachel J (Tulane), Barbara Fash (Northern Illinois) & E W Andrews V (Tulane)

[209] SCULPTURE OF 10L-32, COPAN, HONDURAS.

Archaeological and iconographic evidence from Classic period remains at Copan, Honduras, are combined to elucidate the function of structure 10L-32. Precise excavation methodologies permit the rearticulation of sculptural facades, and also permit a detailed iconographic study of the sculptural elements. The 1990 investigations of this ceremonial pyramid yielded 1038 pieces of sculpture, which form a complex set of motifs relating to water, ritual, sacrifice, and warfare, indicating the 10L-32 Group's function as a place of ritual.

Hamilton, Rachel J (Tulane) [Introduction 201]

Hammett, Julia E (New Mexico)

[402] INTERREGIONAL PATTERNS OF LAND USE AND PLANT MANAGEMENT IN NATIVE NORTH AMERICA.

Regional perspectives have dominated the landscape of North American archaeology and hence paleoethnobotanical studies. Preliminary cross-regional comparison of land use strategies results in the emergence of several patterns. A select number of plant families were the source of most native crops in temperate North America. Later, although approximately 1000 years apart, corn and beans diffused separately, but apparently simultaneously, into the Great Basin and eastern United States. By the time of European contact, periodic burning in discrete patches was practiced extensively by Native Americans to manage plant and animal resources. This interregional perspective is essential to understanding plant/people interactions throughout North America.

Hancock, Ronald G V (Toronto), Patrick J Julig (Laurentian) & Laurence A Pavlish (Toronto)

[309] PROVENIENCING PRE-COLUMBIAN CULTURAL MATERIALS IN THE GREAT LAKES REGION OF EASTERN NORTH AMERICA.

Copper and chert raw materials were among the valuable commodities utilized in the production of the technological tool kits for many prehistoric cultures throughout the world. It is, however, often quite difficult even with experience to visually differentiate copper and chert items with respect to their raw material source location. Chemical analyses using instrumental neutron activation analysis (INAA) provide a rapid technique for the proveniencing of copper and chert. Chemical discrimination based on a suite of elements can provide useful insights into pre-Columbian people's economic behavior.

Hancock, Ronald G V (see Pavlish, Laurence A) [309]

Handsman, Russell G (American Indian Archaeology Institute) [Plenary session]

[216] ARCHAEOLOGY AGAINST HISTORY: EXPLORING FUTURE PASTS.

Hantman, Jeffrey L (Virginia)

[102] GEOGRAPHIC CENTRALITY AND INTER-TRIBAL RELATIONS IN VIRGINIA, 1450-1700.

The focus of this study is the transformation of inter-tribal sociopolitical relations among Virginia Indian groups following the establishment of the Jamestown colony. It is suggested that prior to European colonization, Indian groups in the Virginia interior were more central to continent-based prestige exchange systems. The European presence at Jamestown shifted the center of prestige exchange links in Virginia to the Atlantic Coast. These shifts dramatically affected local and regional political organization. To evaluate that hypothesis, archaeological data from before and after 1600 are reviewed for the coastal plain (Powhatan), piedmont (Monacan), and southwest Virginia regions.

Hare, Timothy S (Iowa)

[607] BLADE CORE TECHNOLOGY AT THE GAST FARM SITE (13LA12): THE ACQUISITION AND PROCESSING OF WARSAW TABULAR CHERT DURING THE MIDDLE WOODLAND PERIOD.

The Middle Woodland component at the Gast Farm site (13LA12), identified by the presence of Havana and Hopewell ceramics, is characterized by a blade core industry which utilized Warsaw Tabular and Burlington cherts. The Middle Woodland blade industry was part of an interregional exchange network, and Gast Farm was the location of Warsaw Tabular chert blade production. This paper describes and discusses blade production and intra-site distribution patterns, emphasizing the value of studying core technologies for identifying Middle Woodland sites and influences.

Hare, Timothy S (see Enloe, James G) [103]

Hargrave, Michael (Southern Illinois-Carbondale)

[509] FACTORS UNDERLYING CHANGE IN MIDDLE WOODLAND-MISSISSIPPIAN DOMESTIC ARCHITECTURE IN ILLINOIS.

The Middle Woodland-Mississippian interval (200 BC-AD 1400) in Illinois was marked by dramatic changes in the design of domestic architecture. For example, Middle Woodland structures were built at surface level, with circular, oval, or rectangular floor plans, and floor areas ranging to above 100 square meters. By the Emergent Mississippian, most structures were semisubterranean, rectangular, with floor areas less than 10 square meters. Changes in design are examined using data on approximately 700 structures. Key factors underlying these changes include household size, scheduling and diversity of subsistence tasks, and costs related to structure construction, maintenance, and winter heating.

Harris, John, Michael A Adler & Shari Counce (Southern Methodist)

[110] RECENT RESEARCH ON PREHISTORIC POPULATION AGGREGATION IN THE NORTHERN RIO GRANDE REGION.

The Puebloan occupation of the northern Rio Grande region is often cited as an example of a relatively late (13th-14th century AD) adoption of aggregated settlement patterns in the prehistoric Southwest. A number of factors have been cited for this relatively late population aggregation, including high availability of wild resources, low population density, and isolation from important prehistoric socioreligious movements (i.e., kachina cult). These hypotheses are considered in light of recent archaeological work carried out at both small habitations and large aggregated village sites in the vicinity of Taos, New Mexico.

Hart, John P (GAI Consultants)

[204] LATE PREHISTORIC SUBSISTENCE-SETTLEMENT CHANGE IN THE LOWER UPPER OHIO RIVER BASIN.

The late prehistoric Monongahela tradition in the lower Upper Ohio River basin is characterized by large nucleated villages. Unlike many other areas of the Eastern Woodlands, many of these villages are located in upland settings. Explanations of this phenomenon have centered upon intercine warfare. In this paper I suggest that Monongahela subsistence-settlement must be modeled as a response to the topography and climate of the region. Village locations are explained as a means of dividing risk of crop failure by providing access to a variety of topographic and edaphic settings.

Hartley, Ralph J (see Osborn, Alan J) [702]

Hasenstab, Robert (Rutgers)

[107] PREHISTORIC POLITICAL PROCESS AND SPATIAL SCALE: LATE WOODLAND IROQUOIAN INTERACTIONS.

Why did prehistoric Iroquoian peoples undergo tribalization? Were lineages an outgrowth of horticulture? Was warfare a product of bloodfeuding between lineages? Or were larger-scale forces involved? This paper uses world systems theory to argue that regional-scale political processes were the force driving social change. Evidence for these is reviewed, and mechanisms by which they occurred are suggested. Data to be sought to shed light on this issue are proposed.

Haviland, William (Vermont) [Discussant 602]

Haviser, Jay B (Archaeological Institute, Netherlands Antilles)

[503] A POST-SALADOID INTERACTION SPHERE AT ANGUILLA AND ST MARTIN-ST MAARTEN, NORTHERN LESSER ANTILLES.

Archaeological investigations of post-Saladoid sites on Anguilla and St Martin-St Maarten, in the northern Lesser Antilles, indicates a complex pattern of interaction among the Amerindian inhabitants. Geographic and economic aspects of the resources available on these islands are discussed to

identify prehistoric resource-exploitation emphases, and to identify the variety and distribution of prehistoric sites. This paper demonstrates that during the post-Saladoid period, the two islands of Anguilla and St Martin-St Maarten should be seen as a single interaction sphere unit.

Hays, Kelley Ann (Museum of Northern Arizona/Arizona) & Laurie D Webster (Arizona)

[205] NEW TRAILS FOR OLD SHOES: SANDALS, TEXTILES, AND BASKETS IN BASKETMAKER II.

New research on Anasazi origins is augmented with the study of sandals, baskets, and textiles collected by E H Morris, A V Kidder, and Samuel Guernsey in the early 20th century. Relationships among decorative style, technology, and social processes are examined. We contrast these household items with the style and religious content of rock art and discuss the potential relationship between sandal decoration and the role of the individual in society. We show that the technology and style of basket decoration in the Basketmaker II period prefigures the later Anasazi ceramic tradition.

Hayward, Michele, Marlene Ramos Vélez & Marisol Mélenchón Maíz (Instituto de Cultura Puertorriqueña)

[208] CHARACTERISTICS OF ROCK ART IN PUERTO RICO.

Recent investigations of rock art in Puerto Rico and the Caribbean are beginning to provide a more systematic basis for the description and analysis of petroglyphs and pictographs. The results of one such investigation involving three *municipios* in Puerto Rico, along with a review of previous studies, are presented in graphic form, focusing on such characteristics as design elements, environmental locations, relationships to socio-political and religious systems, and techniques of reproduction.

Head, Genevieve (National Park Service) & James Snead (UCLA)

[110] RECYCLING THE CULTURAL LANDSCAPE: PREHISTORIC SITE RE-USE ON THE PAJARITO PLATEAU, NEW MEXICO.

A poorly documented aspect of late prehistoric settlement on the Pajarito Plateau of New Mexico is a consistent pattern of re-use of earlier habitation sites as agricultural features by later populations. This conversion suggests that elements of the former cultural landscape were perceived as resources by later populations. The National Park Service has recorded many sites with characteristics of re-use in its archaeological survey of Bandelier National Monument. Using this information to examine hypotheses related to the social and economic processes behind the manipulation of the cultural landscape, this paper explores the significance of archaeological sites for prehistoric populations.

Healy, Paul F (Trent)

[209] THE ANCIENT MAYA BALLCOURT AT PACBITUN, BELIZE.

Excavations undertaken in 1984 and 1987 of a ceremonial ballcourt at the lowland Maya center of Pacbitun, Belize, have provided details about ancient Maya construction techniques and major diachronic structural changes to this special class of Precolumbian architecture. A description of the excavations and construction history is provided. Analysis of the artifactual remains from the ballcourt indicates it was built during the Late Preclassic period (100 BC-AD 300), but repeatedly and substantially altered during the Classic period (AD 300-900). The significance of the court at Pacbitun is discussed.

Heckenberger, Michael & Cristiana Barreto (Pittsburgh)

[510] EPIDEMIC DISEASE AND DEMOGRAPHIC STRESS IN THE UPPER XINGU: IMPLICATIONS FOR AN ARCHAEOLOGY OF EUROPEAN/AMERINDIAN CONTACT.

In the Upper Xingu region of southeastern Amazonia, direct sustained Amerindian/European contact did not occur until the late 19th century. Examination of disease-related depopulation among Xinguano societies since that time reveals that overall regional depopulation was characterized by punctuated and often isolated demographic "shocks" among individual villages, often followed by periods of recovery. Indigenous responses to these isolated periods of stress, typically invisible archaeologically, were a preeminent factor of change as these societies adapted to decreased numbers and an ever expanding western frontier. General patterns of contact-related change among Amerindian populations are discussed based on these findings.

Hedeager, Lotte & Kristian Kristiansen (Ministry of the Environment)

[603] WARRIOR AND FARMERS IN LATER EUROPEAN PREHISTORY.

The relationship between warring and farming communities is considered in a long-term evolutionary perspective divided into three phases. First, there is interaction between pastoral and sedentary farmers during the 4th-3rd millennia BC. The relationship is characterized by a gradual retreat of the frontier of sedentary farmers. Second, during the Bronze Age, warrior societies develop at the peripheries of complex sedentary agrarian/mining communities, introducing a new dynamic of regional

displacements between the two groups in a period of warrior expansion. Third, during the later Iron Age, warrior societies become integrated through the formation of archaic states.

Hegmon, Michelle (New Mexico State)

[309] HIGH RESOLUTION CHRONOLOGICAL CONTROL THROUGH CERAMIC ATTRIBUTE ANALYSIS: DATING PUEBLO III WHITE WARES IN THE NORTHERN SOUTHWEST.

Complex changes in settlement patterns (culminating in regional abandonment) characterized the late Pueblo III period (AD 1200-1275) in the Mesa Verde region. Describing and interpreting these changes requires more precise chronological control than is presently possible with dating based on pottery types. However, stylistic variation within Pueblo III pottery types has been recognized. This variation is the basis of a method developed to date ceramic assemblages using attribute analysis. The technique focuses on seven attributes of rim morphology and painted designs and can be used to date assemblages with a resolution of thirty to forty years.

Heidke, James M (see Wallace, Henry D) [410]

Hendon, Julia A (Harvard)

[209] FORMATIVE PERIOD SOCIOPOLITICAL EVOLUTION IN SOUTHERN MESOAMERICA: EVIDENCE FROM RECENT WORK IN CENTRAL HONDURAS.

Two seasons of survey and excavation in the Cataguana and Oloman valleys, department of Yoro, Honduras, have revealed a significant Formative period occupation, including a Late Formative ball-court. Drawing on relevant research in Honduras, El Salvador, and Guatemala, this paper discusses the implications of the Yoro material for current models explaining sociopolitical development in southern Mesoamerica during this period. Among the issues considered are the nature and importance of interaction between non-Maya Honduran societies and the Maya, and the role of the ballgame in the florescence of complex political organization during the Formative period.

Henrickson, Robert C (Smithsonian)

[609] A CERAMIC PERSPECTIVE ON ETHNIC AND POLITICAL CHANGE AT GORDION, 1500-200 BC.

From 1500-200 BC a series of ethnic and political groups were dominant at Gordion. Identifying and interpreting their possible impacts on the local ceramic tradition depends on broad based reconstruction of ceramic technology and organization of production. The effects of ethnic, economic, or political change may vary in both type and degree among components of an assemblage. At each transitional point, the development of the utilitarian, special purpose, and fine wares is distinctively different at Gordion.

Hill, Curtis (see Holstein, Harry O) [310]

Hill, James N (UCLA), W Nicholas Trierweiler (Mariah Associates) & Robert W Preucel (Harvard)

[603] THE EVOLUTION OF CULTURAL COMPLEXITY: A CASE FROM THE PAJARITO PLATEAU, NEW MEXICO.

Data from the Pajarito Plateau, New Mexico, are used to test nine theoretical propositions concerning evolutionary responses of hunter-gatherer-horticultural populations to long-term population growth combined with repeated, severe, drought-induced food stress. Four propositions were confirmed, as theoretically expected; the other five yielded mixed but interesting results. It is concluded that such stress can cause evolving cultural complexity, but that the strength of the causal linkages should always be questioned.

Hilliard, Jerry (see Mintz, John) [104]

Hillman, Gordon C (see Moore, Andrew M T) [213]

Hirth, Kenneth G (Kentucky) [Discussant 505]

Hodge, Mary (Houston-Clear Lake)

[507] ARCHAEOLOGICAL AND DOCUMENTARY VIEWS OF SMALL STATES IN POSTCLASSIC MESOAMERICA.

Although documentary accounts of Postclassic central Mexico describe the political histories of small states and report distinct ethnic or social differences among them, archaeological definitions of these entities remain problematical. Methods for identifying and differentiating these small states from one another using archaeological data are presented. The potential of archaeological evidence for identifying social, ethnic, or economic differences among these states is discussed.

Hodgson, Nancy (Iowa)

[607] BOTANICAL ANALYSIS OF THE WEAVER OCCUPATION AT GAST FARM, 13LA12, SOUTHEASTERN IOWA.

This analysis is the first study involving intensive flotation of a systematic sample from a Weaver community west of the Mississippi River. Botanical identifications focused especially on small seeds and nuts. Comparisons are made to contemporary Woodland botanical assemblages from Illinois and Missouri.

Hofecker, John (Argonne National Lab) & Gennady Baryshnikov (USSR Academy of Sciences)

[211] ZOOARCHAEOLOGICAL STUDIES AT MEZMAISKAYA CAVE (NORTHERN CAUCASUS, USSR).

Mezmaiskaya Cave, discovered and excavated by L V Golovanova, is situated at 1350 m asl in the foothills of the northern Caucasus. The cave contains several Mousterian layers dated to the last glacial that have yielded numerous vertebrate remains. Steppe bison and goat predominate among medium/large mammals. The bones are unusually well preserved and many exhibit tool cut marks; evidence of carnivore modification is less common. Skeletal part representation cannot be accounted for in terms of weathering effects, and appears to reflect selective treatment by the occupants of the cave. The Mezmaiskaya assemblage offers interesting comparisons with faunal assemblages from other Mousterian sites in the northern Caucasus, such as Matuzka Cave, Barakaevskaya Cave, and Il'skaya I and II.

Hoffman, Curtiss R (Bridgewater State)

[705] ARCHAEOLOGY UNDER THE GUN: DATA RECOVERY, SALVAGE, AND THE CONSERVATION ETHIC.

A consideration of three data recovery operations in Westborough, Massachusetts, demonstrates some of the opportunities and logistical problems of large scale, open-area excavations. A series of recommendations is made to those who contemplate undertaking operations of this scale in the future.

Hofman, Corinne & Menno L P Hoogland (Rijksuniversiteit Leiden)

[503] POST-SALADOID CERAMIC DEVELOPMENTS ON SABA, NETHERLANDS ANTILLES.

The post-Saladoid habitation history and ceramic sequence on Saba were studied during a five-year excavation program. Ceramic analysis concluded that pottery decoration is not a valuable variable for building a chronology because decorated sherds are minimally represented and decorative techniques seem to be vestigial. Instead, a detailed classification including general vessel shape and specific variations in morphological, stylistic, and technological attribute classes was developed to distinguish variability among later pottery assemblages and build a relative chronology. The classification will be useful in an inter-island context.

Holland, Thomas & Michael J O'Brien (Missouri-Columbia)

[203] THE LIMITS OF EVOLUTIONARY THEORY AS APPLIED TO ARCHAEOLOGY.

For some 30 years archaeology has struggled to establish itself as the science of humans, albeit with limited success. In part, this is due to a typological mindset that is incompatible with the process of modern science. Evolutionary theory offers some hope of escaping this straightjacket, though there has been far too much trumpeting of selectionist theory without an honest appraisal of the theory's limits. Proponents of the theory must first decide what aspects of the archaeological record are amenable to a selectionist approach before any appreciable progress will be realized.

Holley, George R (Southern Illinois-Edwardsville)

[403] LATE PREHISTORIC TOWNS IN THE SOUTHEAST.

An observation for the late prehistoric period in the Southeast is that mega-regional centers (great towns) occurred early (prior to AD 1400), and smaller centers typified the region after this time. This scenario derives from a consideration of site area and volume of mound construction. To go beyond this "devolutionary" sequence, other characteristics of the southeastern centers are examined. Commonalities evident throughout the sequence are used to provide a skeletal model for these centers. With this foundation, changes in the use of integrative mechanisms, resident population, and social differentiation are employed to derive a dynamic characterization of late prehistoric regional centers.

Holmes, Charles E (Alaska State Office of History & Archaeology), David R Yesner & Kristine J Crossen (Alaska-Anchorage)

[312] THE BROKEN MAMMOTH ARCHAEOLOGICAL PROJECT, CENTRAL TANANA VALLEY, INTERIOR ALASKA: PROGRESS UPDATE.

Excavations continued at XBD-131, a multicomponent site dating to three broad time periods (ca 500 BC, ca 5200 BC, and from ca 9500 BC to 8500 BC). Specific goals included: (a) identification and

finer separation of the several distinct habitation episodes found in the deepest strata; (b) more precise dating of the various components; (c) collection of data for reconstructing the past environment; and (d) increasing sample size in all data categories. Additional testing was done at the Mead Site (XBD-071) to better understand the complexity and extent of the late Pleistocene deposits. Regional survey also was conducted to test the hypothesis that landscapes with specific CaCO₃ rich deposits would preserve ancient fauna in archaeological context.

Holstein, Harry O (Jacksonville State), Keith Little (Pensacola Archaeological Lab), Curtis Hill (Jacksonville State) & Caleb Curren

[310] IN SEARCH OF DELUNA'S COOSA.

Excavations at the Terrapin Creek Site, 1Ce309, resulted in defining the temporal chronology of the protohistoric Weiss Ceramic phase and reevaluating archaeological data obtained from several Weiss Phase Village sites previously investigated in the 1950s. This information coupled with geographical descriptions obtained from the DeLuna's documents indicated the 16th-century principal town visited by the DeLuna expedition lies at the confluence of the Chattooga and Coosa rivers, Cherokee County, Alabama.

Homburg, Jeffrey A (see Ciolek-Torrello, Richard S) [701]

Hoogland, Menno L P (see Hofman, Corinne) [503]

Hosler, Dorothy (MIT)

[301] RECREATING THE PAST IN POTTERY AND MYTH.

Las Animas is a community of pothunters and potters in northern South America who make copies of ceramic archaeological artifacts. The results of my 15-month ethnographic-technological research there show that community members are constructing an "ethno" history at the same time that they are recreating the artifacts that are its material correlates. Animeno history accounts for the technological acumen of the prehistoric potters, the characteristics of the archaeological sites community members "excavate," and it links potters to their prehistoric predecessors.

Houston, Stephen D (Vanderbilt) & James Brady (Petexbatún Archaeological Project)

[610] STAMPED POTTERY OF THE CLASSIC MAYA: CLUES TO CERAMIC PRODUCTION AND INTERSITE CONTACT IN PETEXBATÚN, GUATEMALA.

Recent excavations in the Classic Maya sites and caves of Petexbatún, Guatemala, have recovered an abundant corpus of ceramics with stamped impressions. Study of several hundred impressions and of the vessels they embellish confirms the existence of a limited and highly idiosyncratic set of stamps, permitting inferences regarding ceramic exchange and chronology against a backdrop of dynastic interaction during the Late Classic period. This investigation, the first such in the Maya region, focuses less on normative design categories than on a variety of unique impressions.

Howell, Todd L (Arizona State)

[304] THE DECISION-MAKING STRUCTURE OF PROTOHISTORIC ZUNI SOCIETY.

The decision-making structure of any society ultimately depends on the number and distribution of decision-makers among different social groups. Mortuary data, encompassing 1000 individuals in spatially discrete cemeteries at the protohistoric site of Hawikku, are used to examine the decision-making structure of Zuni society. Mortuary correlates of leadership and corporate group membership are used to identify potential leaders and corporate groups. The distribution of leaders among corporate groups is used to reveal the nature of decision-making (achieved vs ascribed), the degree of political centralization, and the range of decision-making roles in pre- and post-contact Zuni society.

Huckell, Bruce B (Arizona State Museum)

[604] MID-LATE HOLOCENE STREAM BEHAVIOR AND THE TRANSITION TO AGRICULTURE IN SOUTHEASTERN ARIZONA.

As part of research into the beginnings of agriculture in southeastern Arizona, recent study has focused on the discovery, stratigraphic mapping, flotation sampling, and radiometric dating of preceramic sites buried in floodplain alluvium. The stratigraphic contexts and chronometrics of 15 Late Archaic sites with cultigens are summarized, and regional, mid-late Holocene trends in stream behavior and climate are identified. The appearance and proliferation of Late Archaic agricultural sites is shown to be closely related to a shift from stream entrenchment to rapid deposition and floodplain aggradation. The significance of such a change for the transition to agriculture is explored.

Hughes, Susan S (Washington/BLM)

[515] THE POINT OF THE SHAFT: EVOLUTIONARY CHANGE IN PREHISTORIC WEAPONRY.

Projectile point form varies through time. Most explanations of diachronic variation focus on stylistic attributes, alluding to movements of people or ideas. A point, however, is a functional

element of a weapon, designed to enhance penetration. Functional engineering of points and weapon delivery systems (e.g., bow and arrow, atlatl) are examined to define those point attributes that enhance the success of weapon systems. These attributes are used to examine a 9000 year sequence of projectile points recovered from northwestern Wyoming. Explanations for the resulting time/space patterns in projectile point form are discussed.

Hughey, Michael (see Michlovic, Michael) [301]

Hunt, Terry L (Hawai'i)

[704] DYNAMIC SOCIAL BOUNDARIES IN THE YASAWA ISLANDS OF FIJI.

The archaeological record of the Fiji Islands is dominated by fortified settlements, yet there exists contemporaneous evidence for widespread exchange among communities. This seemingly paradoxical concurrence of intergroup hostility and interaction is explored in the Yasawa Group of northwestern Fiji, where recent work provides data from 143 sites on seven islands, including fortified and open occupations. Patterns of interaction among communities are deduced from the distribution of ceramic styles along with analyses of variability in ceramic composition and technology. The Yasawa results offer a glimpse of complex relations that form dynamic social boundaries.

Hunt, Terry L (see Gordon, Elizabeth A) [307]

Iannone, Gyles J (Trent)

[209] AN INQUIRY INTO THE ORIGINS OF MAYA ECCENTRIC LITHICS.

"Eccentric" lithic artifacts form part of a much larger Maya lithic industry which until recently had been the subject of only limited investigation. To date three competing hypotheses have been proposed regarding the origins of Maya eccentrics. These hypotheses argue for either Central Mexican, Guatemalan Highland, or *in situ* Maya Lowland origins. Through an exploration of the available evidence it is concluded that *in situ* Lowland development is the most viable of these hypotheses.

Iceland, Harry (US Information Agency) [Workshop]

[201] THE FULBRIGHT PROGRAM.

Imhof, Christopher James (see Murphy, Tracy) [210]

Ingbar, Eric

[404] LITHIC MATERIAL SELECTION AND TECHNOLOGICAL ORGANIZATION.

Raw material is often used to infer mobility patterns of prehistoric groups. This paper presents (1) a simulation of raw material use and resulting assemblage patterns; (2) a consideration of raw material utilization in Paleoindian assemblages; and (3) a discussion of how source identification can most fruitfully be employed in studies of prehistoric organization.

Isaac, Barbara (Harvard-Peabody)

[202] THE PEABODY MUSEUM, HARVARD: REALIZING REPATRIATION.

The North American collection at the Peabody Museum totals around one million pieces, many of extraordinary interest, an as yet undetermined number of which will have to be considered for repatriation. The director and the staff followed closely the course of the legislation and, once the law had been signed, began to plan accordingly. Factors affecting planning and its formalization are described; subsequent successes and difficulties in implementation are discussed.

Jackson, H Edwin & Susan L Scott (Southern Mississippi)

[508] BONE ASSEMBLAGES, MEAT CONSUMPTION PATTERNS, AND SOCIAL RANKING: A VIEW FROM THE SOUTHEASTERN US.

Examples from zooarchaeological studies of southeastern chiefdoms are used to explore faunal correlates of elite rank. While some "elite" patterns can be identified archaeologically, other factors may obscure clear rank-related patterning. For instance, because social ranking evolves within a context of intensified public ritual that includes ceremonial feasting, interpreting faunal refuse in elite archaeological contexts to be representative only of elite diets may be spurious; recognition of dietary differences related to elite membership requires that the refuse of elite domestic contexts be distinguished from that derived from ritual feasting contexts.

Jackson, Lawrence J (see McKillop, Heather) [610]

Jackson, Martha (Washington)

[412] IDENTIFICATION OF PIGMENTS IN MISSISSIPPIAN CERAMIC SLIPS AND PAINTS.

Polychrome ceramics in eastern North America are typically limited to late Mississippian contexts in the Mississippi Valley and Caddoan areas, where they have been used extensively as chronological markers. Although recent work has addressed the technology of Mississippian ceramic paste, the

polychrome additions have not been studied in their own right. Results of energy-dispersive X-ray analysis of slips and paints from several locations in the Central Mississippi Valley are presented and explored in terms of their potential for informing on technology and social interaction.

Jackson, Thomas J (Biosystems)

[107] DEFINING SMALL SCALE WORLD-SYSTEMS IN CALIFORNIA PREHISTORY: THEORY AND METHOD.

Students of California prehistory have long debated the theoretical implications of significant diversity among prehistoric cultures in the region. Although ethnological models have been the most frequent reference by which to elaborate and explain archaeological findings, a successful model of cultural interaction explaining marked differences in intra-regional relative "wealth," social structural complexity, and economic interaction patterns has not been forthcoming. Theoretical concepts of small-scale world systems allow the integration of a number of models of core/periphery social-cultural interactions to hypothesize how cultural groups of central California and southern California developed in such diverse fashions in late prehistory.

Jacob, John (Texas A & M)

[407] THE MAYA CLAY: LATE CLASSIC SEDIMENTATION IN THE WETLANDS OF NORTHERN BELIZE.

A distinctive buried soil is found in the margins of most wetlands of northern Belize. The buried soil commonly has incised canals and other features suggesting the ancient Maya used it as a planting surface. Overlying the buried soil are fine-grained sediments we have termed the "Maya Clay." The Maya Clay has been dated to no earlier than the Late Classic and was most likely derived from accelerated erosion of the adjacent uplands. Several mechanisms for the transport of the Maya Clay are discussed, as well as implications for productivity of the wetlands after deposition of the Maya Clay.

Jacobs, David (see Craig, Douglas B) [701]

Jacobson, LouAnn (BLM) [Workshop 401]

Jacobson, LouAnn (see Gerow, Peggy) [502]

Jameson, John H Jr (National Park Service) [Discussant 406]

Jamieson, Susan (Trent)

[412] ONTARIO IROQUOIS EVOLUTION: UNDERSTANDING CULTURE PROCESS IN THE NORTHEAST.

Recent studies have argued that northeastern 'Iroquoianization' can be explained by a west to east time-transgressive Cahokia as periphery-Iroquoia as margins model. This paper discusses the issues with reference to archaeological data from Ontario, Canada. Ontario trait distributions indicate that although the model may offer general insight into northern Iroquois development, it does not adequately summarize the complex patterns of 'Iroquoianization' for that area. These are explicated by a less restrictive Mississippian periphery-margins model that interprets northeastern culture processes in light of developments occurring after ca AD 900 throughout the eastern half of the North American continent.

Jansen, Henrik M (Svendborg County Museum)

[408] FROM DISCONTINUITY TO CONTINUITY: THE ESTABLISHMENT OF DENMARK.

Villages, already established as a settlement form before the time of Christ, dominated settlement patterns in medieval and later Denmark. In the fifth century AD, the number of settlements declined, then a new expansion occurred between AD 800 and 1300. Between 500 BC and AD 1000 settlements shifted location at intervals of 100 to 200 years. Later, settlements stabilized with the introduction of medieval methods of cultivation and the establishment of new social systems. Seasonal marketplaces of earlier times were replaced by permanent settlements of the Viking period, including cities founded by royal authority.

Jefferies, Richard (Kentucky)

[310] MISSISSIPPAN SETTLEMENT ALONG THE UPPER CUMBERLAND RIVER OF SOUTHEASTERN KENTUCKY.

Although archaeological sites dating to the Mississippian period have been individually documented along the Upper Cumberland River in the southeastern Kentucky mountains, no systematic analysis of their spatial, temporal, or social contexts has ever been conducted. Recent literature review and preliminary fieldwork have identified more than 100 sites in the region containing late prehistoric components. This paper investigates the nature and distribution of these sites in the region. Compari-

sons are made with late prehistoric occupations found in adjacent portions of Kentucky, northeastern Tennessee, and southwestern Virginia.

Jelks, Edward B (see Martin, Terrance J) [612]

Jeske, Robert J (Indiana-Purdue-Fort Wayne)

[204] SOCIAL RISK AND INTEGRATION: THE UPPER MISSISSIPPAN SETTLEMENT OF THE SOUTHERN LAKE MICHIGAN REGION.

Northern Illinois and Indiana provide a unique laboratory for examining Upper Mississippian settlement patterns. At least four distinct ceramic traditions are represented in the region during the time period of AD 1100 to 1500. Some of these ceramics have complementary and/or exclusionary geographic distributions. While microenvironmental variation may play a role in these distributions, it is suggested that social risks and rewards are major factors in explaining the apparent maintenance of social boundaries in this region. The development of ethnic boundaries as an economic strategy is discussed and applied to the data from northern Illinois.

Jochim, Michael A (UC-Santa Barbara) [Discussant 305]

Johnson, Eric S & Dorothy Schlotthauer Krass (Massachusetts-Amherst)

[106] PRACTICUM: CHALLENGING DOCUMENTS.

What can we learn from archaeologically derived evidence that we can't learn from documentary evidence? How can teachers use material evidence from the past to teach the analytical skills needed for evaluating all categories of evidence? This practicum will present a classroom exercise in which artifacts are used to teach about native people in the historical period in New England, and about the interpretive nature of history.

Johnson, Eric S (see Krass, Dorothy Schlotthauer) [106]

Johnson, Lyn (see Wallace, Henry D) [410]

Johnson, Phillip C (Ohio State)

[214] THE USE OF DIGITAL SURVEYING TECHNIQUES TO DOCUMENT AND INTERPRET ARCHAEOLOGICAL SITES.

I demonstrate how several developing technologies, in digital data collection and display, can be used to obtain accurate and thorough surveys at remote sites. Specifically, the methodology uses the satellite-based Global Positioning System in digital stereo-film and video for data collection, positioning, and orientation of objects in an accurate universal coordinate system. As an example, the results of a survey at Kiva A, Pueblo Bonito (Chaco Canyon, NM) are displayed in a three-dimensional computer model.

Johnson, William C (Michael Baker Jr)

[1] THE PROTOHISTORIC MONONGAHELA AND THE CASE FOR AN IROQUOIS CONNECTION.

The evolution of the Monongahela culture in western Pennsylvania is marked by sustained interaction between Middle Ohio Valley societies between AD 1100-1450. During the final decades of the late prehistoric period, changes in ceramic decorative modes suggest a reorientation of the direction of Monongahela contacts toward Iroquoian groups in the Northeast. By the beginning of the protohistoric period, these contacts grew to include societies as far east as Chesapeake Bay. Archaeological and ethnohistoric data indicate the dispersal of the Monongahela by 1635, almost surely at the hands of the Seneca.

Johnson, William C (see Speedy, D Scott) [605]

Johnston, Kevin (Yale)

[209] HIDDEN HOUSES OF THE CLASSIC MAYA: NONMOUNDED RESIDENTIAL STRUCTURES AT ITZAN, GUATEMALA.

A traditional emphasis in Maya archaeology on the investigation of conspicuous, mounded architecture has yielded a fragmentary picture of the wide range of socioeconomic and political variation within Maya society as reflected in architectural variation. Recently discovered at Itzan, Guatemala, "hidden" houses (nonmounded Late Classic residential structures that leave no surface remains) generate upwardly revised estimations of the size, density, and composition of the Late Classic Maya population. These estimations have important implications for assertions concerning appropriate levels of Maya agricultural technology, the socioeconomic and political organization of Maya society, and the role of demographic variables in Maya cultural change.

Jones, Dennis (see Steffen, Anastasia) [310]

Jones, George T (Hamilton) & Robert D Leonard (New Mexico)

[203] ADAPTATIONIST AND SELECTIONIST EXPLANATION.

This paper addresses what constitutes acceptable processual explanation in archaeology. Borrowing from previous studies, we draw the important distinctions between materially based and ideationally based explanation. Interestingly, the dominant form of processual explanation—adaptationism—is strongly ideational owing to its Lamarckian assumptions which locate cause in human motivation. This means that attempts to evaluate any purported explanation will be incomplete since such evaluations cannot be lodged exclusively in the material record. By contrast, selectionist explanation is intended to be materially based and thus empirically sufficient. Drawing on archaeological examples, we contrast these forms of processual explanation in seeking appropriate ways that archaeologists may explain the cultural evolutionary record.

Jones, Janet D (Bucknell)

[609] CORE-FORMED GLASS VESSELS FROM PERSIAN GORDION: LUXURY GOODS FROM THE WEST.

The appetite of Persian period Gordion for Greek luxury items is borne out by the presence of numerous (ca 125) fragments of core-formed glass vessels from east Greek workshops. Core technique, a labor-intensive method of manufacturing glasswares, produced brightly colored, small glass versions of some Greek ceramic vessel shapes. This paper explores the ways in which the glass from Gordion adds to our knowledge of exchange between Greece and Gordion during the period of Persian domination, and what this demonstrates about the development of core glass in the eastern Mediterranean.

Jones, John G (Texas A & M)

[407] MICROBOTANICAL EVIDENCE OF PREHISTORIC FOREST MODIFICATION IN NORTHERN BELIZE.

Analysis of a series of sediments and pollen and phytolith-bearing cores has yielded a remarkably clear picture of the paleoenvironment of northern Belize during the last 8000 years. Anthropogenic alterations of the natural vegetation in this region also are apparent from these micro-botanical assemblages. Detailed analyses provide information on initial forest clearing and settlement, as well as insights into the forms of agriculture practiced in the past. Through the use of pollen concentration values, anthropogenic effects often can be separated from those caused by climate change or natural effects.

Jones, John G (see Pope, Cynthia L) [501]

Jordan, James (Alaska Quaternary Center)

[513] LATE HOLOCENE OCCUPATION OF A TRANSGRESSIVE BARRIER ISLAND COMPLEX, KOTZEBUE SOUND, ALASKA.

A dynamic history of progradation, human occupation, and rapid erosion of shoreface deposits is preserved along a 150 km-long chain of low-elevation, sandy barrier islands between Kotzebue Sound and Bering Strait, Alaska. Barrier beach ridge and overwash deposits record regional shifts in meteorological boundary conditions that have controlled island geomorphology and the spatial/temporal formation of sites during the last 2 ka. Occupation began after the system shifted to transgressive conditions and accelerated dune building about 1500 yr BP. Barriers are presently undergoing rapid shoreface retreat and landward migration, transgressing this brief but extensive period of occupation.

Joyce, Arthur A (Rutgers) & Judith F Zeitlin (Brown)

[306] THE IMPACT OF INTERREGIONAL INTERACTION ON CLASSIC PERIOD SOCIETIES OF COASTAL OAXACA.

This paper examines the nature and impact of external contacts on Oaxaca Coast society during the Classic period. Research on the western coast suggests significant involvement with Teotihuacan during the Early Classic, including evidence for the diffusion of ceramic styles and exchange. Along the eastern coast, the data suggest few contacts with Teotihuacan and instead reflect interaction with the Gulf Coast. Gulf Coast contacts, possibly including the spread of the "ballgame cult," continue during the Late Classic as evidence for interaction with Teotihuacan declines.

Joyce, Arthur A (see Zeitlin, Robert N) [306]

Judge, Christopher (Diachronic Research Foundation)

[106] ARCHAEOLOGISTS IN THE EDUCATIONAL PROCESS: ARCHAEOLOGY IN SOCIAL STUDIES CURRICULUM.

One of the greatest challenges in the field of archaeology is interpreting archaeological knowledge to the general public. Most archaeologists are not trained as educators, and most educators are not trained as archaeologists. To that end, the development of archaeological curriculum should be a joint

effort between the disciplines. While archaeologists hold the knowledge, educators are in the best position to know techniques and approaches for conveying the information to the students. This paper describes a program designed to develop teaching modules for South Carolina schools through the University of South Carolina.

Judge, Christopher (see Friedman, Ed) [106]

Julig, Patrick J (Laurentian) & Andrew Stewart (Royal Ontario Museum)

[710] ENVIRONMENTAL INSTABILITY AND HUMAN RESPONSE: PALEOINDIAN BEHAVIOR IN THE GREAT LAKES REGION.

Organizational strategies for early Paleoindians (EPI) and late Paleoindians (LPI) are compared using data from their lithic technologies, site types and locations, and paleoecological data. Environmental instability and rapid change characterized the EPI period (ca 11,500–10,000 BP), with stabilizing environments during the subsequent LPI period. These differences in environmental stability have implications for differences in human response over the short term. These responses are reflected in changes in the range of site locations, design and use of stone tools, and possibly diet breadth.

Julig, Patrick J (see Hancock, Ronald G V) [309]

Julig, Patrick J (see Pavlisch, Laurence A) [309]

Junker, Laura Lee (Vanderbilt)

[511] CRAFT SPECIALIZATION AND PRESTIGE GOOD EXCHANGE IN 15TH-16TH CENTURY PHILIPPINE CHIEFDOMS.

While archaeological evidence and Chinese historical sources indicate the presence of complex societies in the Philippines by early first millennium AD, recent archaeological research in the Bais region of Negros Island suggests the emergence of more complex chiefdoms in the 15th–16th centuries. Greater sociopolitical complexity is accompanied by increasingly centralized control of ceramic and metal production, as exchange goods in both foreign (Chinese) and inter-polity prestige-good trade. This is demonstrated through analyses of morphological standardization in pottery, coupled with archaeological investigation of changing distribution patterns between AD 500–1500 in the Bais region chiefdom.

Kang, Bong (Oregon)

[511] A REEXAMINATION OF KOREAN MEgalith TOMBS AND SOCIAL ORGANIZATION.

The megalithic tomb society of the Korean Peninsula has long been considered to be a chiefdom in terms of socio-evolutionary perspectives. Yet, the stone structures have not revealed much convincing archaeological evidence except for energy expenditure to support the argument. This paper focuses on methodological issues with reference to reinterpretation of existing archaeological data and critical mortuary analyses. On the basis of quantitative and qualitative reexamination of the available archaeological data sources from southern Korea, it is suggested that Korean megalithic tomb society is closer to an egalitarian form of social organization than to a chiefdom.

Kardulias, P Nick (see Toumazou, Michael K) [311]

Kataoka, Osamu (see Ayres, William S) [508]

Keates, Susan (Oxford)

[613] THE EVOLUTION OF HOMINID BEHAVIOR IN PLEISTOCENE CHINA.

The Early Pleistocene assemblages of Xiaochangliang and Donggutuo in the Nihewan Basin, northern China, represent the earliest evidence of hominid occupation of a temperate environment. This paper presents new results of lithic analyses and compares hominid activity patterns here to the Late Pleistocene Xujiaoya site in the neighboring Datong Basin. The relevance of the extensive temporal and spatial distribution of tool classes common to these and other hominid localities is discussed in the context of the paleobehavioral evolution and morphological transition from *Homo erectus* to *H. sapiens* in China. This paper also introduces a new system of tool classification.

Kehoe, Alice B (Marquette)

[107] LINKING THE PACIFIC AND ATLANTIC SYSTEMS: THE NORTHERN PLAINS.

Lewis and Clark followed the Mississippian period routes. Agricultural towns along the Missouri system were market centers and entrepôts for expensive items such as marine shells. Summer rendezvous camps—intermittent towns—were additional market centers. Northern Plains linked into the Great Lakes-St Lawrence system via Canadian rivers. Knife River flint is a tracer for mid-continent trade (into Ontario). Northern Plains was a low-population density region producing primarily animal products (pemmican?) for the mid-continent, but its highly mobile people maintained

important trading systems through which the Northeast and Mississippian nations linked into the Pacific Coast-Columbian world.

Kelly, Lucretia & Suzanne Kutterer-Siburt (Cahokia Mounds State Historic Site)
[106] CAHOKIA MOUNDS AND THE ST LOUIS PUBLIC SCHOOLS: PARTNERS IN EDUCATION.

Through a unique partnership with the St Louis Public Schools, Cahokia Mounds conducts programs in archaeology and prehistoric Indian culture for scores of pre-college students in the St Louis area. Expanded versions of the site's educational programs are brought into the classroom and target all grade levels. Within this program inner city schools are paired with county schools. In addition to learning about prehistoric Indian culture, students are exposed to one another's cultural backgrounds. This presentation elaborates on this unique program and offers an example of the hands-on activities that are integral to Cahokia's educational programs.

Kelly, Lucretia (see Kutterer-Siburt, Suzanne) [106]

Kelly, Lucretia (see Kutterer-Siburt, Suzanne) [406]

Kelly, Robert L (Louisville) [Discussant 305]

Kelly, Robert L (Louisville) [Discussant 404]

Kent, Susan (Old Dominion)

[510] ANEMIA, DIET, DISEASE, AND SEDENTISM: HEMATOLOGY OF NOMADIC AND SEDENTARY MODERN HUNTER-GATHERERS AND IMPLICATIONS FOR ARCHAEOLOGICAL INTERPRETATIONS OF PAST DIETS AND DISEASE.

The prevalence and kind of anemia present among modern Kalahari nomadic and sedentary hunter-gatherers with adequate diets is compared to sedentary former Kalahari hunter-gatherers with inadequate diets. Sedentism, in contrast to diet, is found to be the cause of high levels of anemia and morbidity at the sedentary communities. The causes of the anemia of chronic disease are discussed in light of past and modern shifts to sedentism and aggregation. It is suggested that dietary interpretations based on skeletal populations exhibiting high frequencies of porotic hyperostosis resulting from anemia need to be rethought.

Kenyon, Dienje M E (SUNY-Binghamton)

[312] BEYOND THE OBVIOUS: NON-CARIBOU REMAINS FROM AN ESKIMO CARIBOU HUNTING CAMP.

Faunal data are one of several informational sources for the interpretation of archaeological remains. Utilizing the faunal remains from the Lorenz Overlook site [a northeast Alaskan protohistoric Eskimo caribou hunting camp or village], this paper demonstrates the significance of the non-caribou remains in detailing daily living patterns, providing corroborative evidence for the season(s) of occupation, and providing additional evidence for the behavior of provisioning an external group (American whalers) that is hypothesized for this group, based on historical and artifact analyses. The non-caribou remains represent approximately 10% of the assemblage, yet provide substantial contextual data otherwise unavailable.

Kerber, Jordan E (Colgate)

[705] INTEGRATING PUBLIC EDUCATION AND ARCHAEOLOGICAL RESEARCH IN CULTURAL RESOURCE MANAGEMENT: A CASE STUDY.

The crisis of archaeological site destruction by private development is rampant throughout the northeastern United States. This paper presents an approach to combat such a problem. A three-year series of public field school and workshop sessions held at the Lambert Farm site in Rhode Island provides a successful model for cultural resource management of an important yet endangered prehistoric site. This educational program resulted in the recovery of significant information and the heightening of public awareness of both archaeology and the site destruction crisis in a way that can contribute towards the protection of material remains from similarly threatened sites.

Kievit, Karen (Colorado)

[105] THE ARCHITECTURE OF CERÉN.

Excavations at Cerén, El Salvador, have exposed ten buildings preserved in almost pristine condition through burial by volcanic ash. Included are domiciles, storehouses, a kitchen, and other special purpose structures. Such earthen domestic architecture is relatively unknown. This paper describes and analyzes architectural forms and features (roofs, wall, cornices, benches, etc), materials (adobe, wood, thatch, stone), construction techniques and procedures, and relational layout at Cerén. It adds

to the body of literature on Mesoamerican domestic architecture, augmenting the more common literature on monumental architecture, and may shed some light on the ethnic affiliation of Cerén.

Killick, David (Arizona) & Chaphuruka Kusimba (Bryn Mawr)

[708] IMPORTED METALS IN EARLY SWAHILI SITES ON THE KENYAN COAST.

Early Swahili sites on the East African coast date from the 8th through the 10th centuries AD and typically consist of stone- or coral-built elite residences and mosques in a town of humbler mud-walled dwellings. Metallographic study of metal objects from the elite residences suggests that most were made outside Africa, and probably in India or the Arabian Peninsula. These results, together with the evidence of the ceramic and glass assemblages, suggest occupation by a wealthy immigrant trading elite.

Killion, Thomas W (Smithsonian) & Nicholas Dunning (Cincinnati)

[704] WALLS, WARFARE, AND AGRICULTURE IN THE LATE CLASSIC PETEXBATUN, GUATEMALA.

While the agricultural techniques utilized by the ancient Maya are now coming into focus, our understanding of the intracommunity land-holding practices and social boundaries which structure all systems of land use is still very rudimentary. Recent research in the Petexbatún region of Guatemala has revealed a system of well preserved walls and terraces dating to the 8th and 9th centuries, reflecting high levels of community competition and intensive agricultural production. Partitioning of the Petexbatún settlement system is discussed in terms of agricultural intensification and warfare in the Late Classic. A model of state-administered agriculture in a conflictive political environment is briefly outlined.

Killion, Thomas W (see Bray, Tamara L) [202]

Kimball, Larry R, Thomas R Whyte (Appalachian State) & Donna C Boyd (Radford)

[310] ARCHAEOLOGICAL INVESTIGATION OF LAKE HOLE MORTUARY CAVE.

The excavation of 24 m³ of looter-disturbed deposits from a mortuary cave in northeastern Tennessee has yielded abundant human skeletal remains, large and diverse faunal and floral samples, burial artifacts, and torches. This sample represents at least 95% of the original archaeological deposit in this cave. Although the deposits had been disturbed, the large sample size and the excellent organic preservation permit the definition of a previously unknown ceramic ware and use of a cave strictly as a mortuary facility. The results of the faunal, lithic, ceramic, sedimentological, bioarchaeological, and archaeobotanical analyses are presented in this report.

Kimball-Brown, Margaret (see Kutterer-Siburt, Suzanne) [406]

King, Julia A (Jefferson Patterson Park & Museum)

[606] 'THE TRANSIENT NATURE OF ALL THINGS SUBLUNARY': ROMANTICISM, SOCIAL POWER, AND RUINS IN THE 19TH CENTURY CHESAPEAKE.

At any point in time, landscapes consist of both contemporary features and features from earlier periods. This paper examines architectural ruins in the rural landscape of the 19th century Chesapeake. At least some of these ruins served symbolic functions, not unlike the ruins portrayed in contemporary Romantic literature and painting. Archaeological and documentary evidence indicate that these ruins represented a sort of popular history within local plantation communities. These ruins may have been used to justify a traditional but failing economic system and to reinforce the social power of the few members who controlled land, labor, and politics in this oligarchic society.

King, Ron (Nevada-Reno)

[208] HUNTER-GATHERER CERAMICS: A VIEW FROM EASTERN NEVADA.

The presence of ceramic industries among Great Basin hunter-gatherers conflicts with current concepts of high mobility. Recent and previous investigations in Ruby Valley, Nevada, have helped document the extent of late prehistoric Shoshone ceramic industries. These data are drawn together in order to explore the complexity of these industries, including vessel and non-vessel forms, ceramic constituents, manufacturing techniques, design elements, use, and temporal placement. This Shoshone assemblage also is compared cross-culturally with other hunter-gatherer ceramic traditions.

King, Ron (see Tipps, Julie) [410]

Kintigh, Keith W (Arizona State)

[304] POST-CHACOAN ORGANIZATIONAL DEVELOPMENTS AS EVIDENCED AT THE HINKSON SITE.

The century following the collapse of Chaco is often viewed as a time of cultural backsliding. However, organizational foundations of well-known Pueblo IV towns are clearly evidenced in impos-

ing, yet under-appreciated sites dating between AD 1150 and 1250. This paper presents the first detailed report on excavations at one such Zuni-area settlement, the Hinkson site. This large community has 25 room blocks and such Chaco-inspired features as a two-story great house, roads, and an enormous, unroofed great kiva. I argue that recognition of this phenomenon requires reformulation of current conceptions of post-Chacoan, Anasazi social integration.

Kintigh, Keith W (Arizona State) [Discussant 103]

Kirch, Patrick V (UC-Berkeley) [Discussant 307]

Kirkendall, Melissa (see Erkelens, Conrad) [307]

Kite, Steve (see Brashler, Janet G) [710]

Kleidon, James (see Bradley, Bruce) [514]

Klein, Michael (Virginia)

[515] OF TIME AND THE RIVER: AN "ABSOLUTE SERIATION" APPROACH TO CERAMIC CHRONOMETRY IN THE JAMES RIVER VALLEY OF VIRGINIA.

Precise chronological control is critical for processual archaeological research, regardless of the theoretical framework structuring the research. Braun (1985) argues that a fine-grained, replicable chronology can be constructed by analyzing temporal trends in vessel wall thickness and temper size. Over time, as dependence on starchy seeds, particularly maize, increased, potters created vessels with thinner walls to enhance thermal conductivity. This research tests Braun's model by analyzing temporal trends in ceramics from the James River Valley of Virginia that span the transition from the broad-spectrum Middle Woodland adaptation to the horticultural societies of the contact period (ca AD 200-1600).

Klein, Terry H (Greiner)

[504] CERAMICS AND THE ARCHAEOLOGY OF 19TH CENTURY AMERICAN URBAN HOUSEHOLDS.

Recent workshops on the status of urban archaeology have revealed a dissatisfaction with the current direction of urban archaeological research. This research seems to take place in a vacuum, with no consideration or understanding of the society that is being examined. Thus, the results of this research are often trivial and uninformative. This is most evident in the analyses of ceramic assemblages from urban sites. If placed within their appropriate cultural context, however, the ceramic assemblages can be used to study change in American households, both in cities and rural areas.

Kligmann, Débora M (see Figuerero, María José) [212]

Klusken, Steve (Chicago)

[211] SITE TAPHONOMY FROM ARTIFACT ORIENTATION.

Understanding site taphonomy is fundamental to interpretation of artifact industry. Taphonomic processes can be analyzed directly through accurate and comprehensive study of artifact orientations. The integrated electronic recording system at Combe Capelle Bas in Dordogne, France, enabled analysis of stone artifact orientations on a scale never before accomplished. Circular distribution statistics, used in the geophysical sciences, are employed to compare orientation tendency and variation among the stratigraphic levels, assisting in the interpretation of the nature of the stone tool assemblages and the resolution of the excavation's objective.

Knecht, Heidi (New York)

[608] THE SIGNIFICANCE OF VARIABILITY IN THE PRODUCTION SEQUENCES OF EARLY UPPER PALEOLITHIC ORGANIC PROJECTILE POINTS.

Analysis of the operational sequences of Early Upper Paleolithic bone and antler projectile points indicates a high degree of temporal variability in both design and production techniques. The raw material used, the method of manufacture, and the morphology of the resultant projectile point, while standardized at any given time, changed throughout the Aurignacian and Gravettian. The various technological approaches are indicative of the societal context in which the objects were constructed as well as that in which they were put to use.

Kneebone, Ronald R (see Arnold, Philip) [313]

Knudson, Ruthann (National Park Service)

[413] CULTURAL RESOURCE MANAGEMENT IN THE 1990'S.

Cultural resources are an important factor in the human environment, and must be managed in the context of all other elements of the environment. Good environmental stewardship requires affirmative management of our tangible and intangible cultural resources. There is increased public

awareness of the value of cultural resources, and their protection involves the collaboration of resource specialists, decision-making land managers, and the living community with ties to the heritage resources. This involves each individual's learning about other groups' values, special language, and operating constraints and opportunities, and about the overall public benefits and costs of management decisions.

Knudson, Ruthann (National Park Service) [Discussant 101]

Knudson, Ruthann (see Calabrese, F A) [702]

Kodack, Marc (UC-Santa Barbara)

[305] ALTITUDINAL VARIABILITY AND THE ORGANIZATION OF FREMONT SOCIETY IN EASTERN NEVADA.

Altitudinal variability in the distribution and composition of resources is critical to understanding the organization of prehistoric populations in eastern Nevada. These local altitudinal changes mirror global latitudinal variability in hunter-gatherer organization previously described by Binford and Kelly. A model of the Fremont occupation of the southern Snake Range (AD 500 to 1350) is presented using two models of settlement behavior adapted from Simms (1986)—verticality, and raw material acquisition and use.

Koetje, Todd A (Indiana-Pennsylvania)

[103] INTRASITE SPATIAL STRUCTURE IN THE EUROPEAN UPPER PALEOLITHIC.

Over the past 20 years many western European Upper Paleolithic sites have been examined for internal spatial patterning. These analyses suggest three basic modes of internal organization. Hearth focused sites are often large, complex sites with many features and distinctive global and local patterning. Areal focused sites are often scatters of artifacts, and/or occur with severe natural constraints. Structure focused sites frequently show no clear indications of hearths and are free of 'natural' constraints. They are frequently highly patterned around architectural structures, however.

Koetje, Todd A (see Versaggi, Nina M) [509]

Kolb, Charles C (National Endowment for the Humanities)

[411] TALES OF TEOTIHUACAN: THE STATUS OF CERAMIC TECHNOLOGICAL ANALYSES ON CLASSIC PERIOD WARES, II.

During the past 40 years, pastes and aplastics of domestic and imported wares and ceramic artifacts associated with the Classic Teotihuacan period (AD 50-750) in Central Mexico have been analyzed by binocular and petrographic microscopy, in the main, to discern locales of production. Technological studies (Shepard, Sotomayor, Abascal, Kolb, etc) normally were reported individually and independently in the literature. In this paper, the results of completed (Alpha and Beta "Thin Orange," Granular, Copoid, and San Martin Orange) and ongoing investigations (Polished Monochrome, Burnished Monochrome, Red-on-Buff, Coarse Matte, and Fine Matte) are standardized to better compare and contrast these ceramics and more finitely discern potential areas of manufacture.

Koldehoff, Brad (Louis Berger & Associates)

[509] BIFACE TECHNOLOGY AND THE EMERGENCE OF CRAFT SPECIALIZATION.

Various aspects of craft specialization have been addressed by archaeologists, but few have focused their attention on the factors that led to its emergence. This paper examines the role that access to raw material sources may have played in the rise of lithic production specialists. Replication studies suggest that access to large quantities of a suitable raw material was essential to the acquisition and maintenance of a technical skill like the production of large bifaces. The validity of this hypothesis is evaluated by reviewing prehistoric biface production in the Central Mississippi Valley.

Koldehoff, Brad (see Lothrop, Jonathan) [404]

Kornietz, N L (see Soffer, Olga) [211]

Kowalewski, Stephen A (Georgia)

[206] CLOUD, CORN, COPPER, CORE-PERIPHERY, CULTURE AREA.

Were the aboriginal North American "culture areas" of the Southeast, Southwest, and Northwest Coast also "world-systems"? The paper uses ethnographic and archaeological data and follows suggestions by Chase-Dunn and Hall (1991) to explore variation within and between macroregions. In these cases core-periphery differentiation (not typically hierarchical) was common. Macroregional boundaries were diffuse. Major transformations, but not necessarily internal regional growth and collapse, were temporally coordinated, which in the absence of exogenous forces implies a limited

degree of systematic interdependence. Prestige-goods economies were present, but other interaction, including warfare, must be implicated as shaping these macroregional systems.

Kowalewski, Stephen A (Georgia) [Discussant 107]

Kozarek, Sue Ellen (Gray & Pape)

[302] DEMONSTRATING SEDENTISM IN THE ARCHAEOLOGICAL RECORD: A HOPEWELLIAN HOMESTEAD IN SOUTHEASTERN INDIANA.

The Jenison Guard site (12D295) is a Hopewellian habitation situated on the Ohio River floodplain in southeastern Indiana. Preliminary analyses of the floral and faunal remains suggested the site was occupied on a year-round basis. The research presented here focuses on the evidence for organization and maintenance of life space at the site. By comparing this evidence with expectations for the use and maintenance of space among groups that are 1) highly mobile, 2) seasonally migratory, and 3) sedentary, it is demonstrated that this site was occupied for a relatively long, uninterrupted period by a residentially sedentary group.

Kramer, Carol (Arizona) [Discussant 609]

Krass, Dorothy Schlotthauer & Eric S Johnson (Massachusetts-Amherst)

[106] CHALLENGING DOCUMENTS: UNDERSTANDING THE NATIVE AMERICAN EXPERIENCE IN NEW ENGLAND.

If we want to include archaeology in school lessons, we have to convince teachers that archaeology will help them reach the goals they have already set for teaching, otherwise archaeology will be just another subject added to their already overburdened schedules. A Five-College/Public School Partnership summer institute for teachers provides a vehicle for demonstrating how archaeology can be used to enhance the teaching of critical thinking and historical analysis.

Krass, Dorothy Schlotthauer (see Johnson, Eric S) [106]

Kristiansen, Kristian (Ministry of the Environment)

[206] THE EMERGENCE OF THE EUROPEAN WORLD-SYSTEM IN THE BRONZE AGE, 2ND AND 1ST MILLENNIA BC.

It is proposed that from the 2nd millennium onwards there emerged a European world-system based upon international exchange in metal between the Mediterranean and the bronze-producing societies in central and western Europe. It was characterized by several cycles of expansion and collapse, but the system remained intact until the expansion of the Roman empire. The basic structural components and their interaction are described and explained with reference to a world-system model of social and economic dependency.

Kristiansen, Kristian (see Hedeager, Lotte) [603]

Kuhn, Steven L (New Mexico) & Lewis R Binford (Southern Methodist)

[103] PUTTING THE 'SITE' BACK IN SITE STRUCTURE: CAVE MORPHOLOGY AND SPATIAL STRUCTURE AT COMBE GRENAL.

The form of a cave or rockshelter greatly influences the ways people use space within it. At the French Mousterian site of Combe Grenal, long-term changes in the substrate and in the shape and exposure of the sheltered area had marked effects on the distributions of stone tools and the nature and location of hearths and ash lenses. Studies of variation in site structure associated with different "configurations" of the cave provide a means of differentiating patterns directly attributable to the character of the place itself from those reflecting other influences on prehistoric behavior.

Kuniholm, Peter I (Cornell)

[609] DENDROCHRONOLOGY AT GORDION, 2000 YEARS BEFORE BETATAKIN.

Dendrochronological investigations at Gordion and environs enable us to crossdate eastward to the Levant and westward to Italy. Fifteen structures on the Gordion city mound and in nearby tombs can be dated in relation to the Midas Mound Tumulus chamber, as can four more distant Iron Age sites and seven Bronze Age sites. A 1503-year long tree ring sequence (ca 2259-757 BC) wiggle matched by 18 radiocarbon dates, links Middle Bronze Age (Assyrian Colony period), Late Bronze Age (Hittite), and Iron Age (Phrygian) monuments in a single chronological chain.

Kusimba, Chaphuruka (see Killick, David) [708]

Kutterer-Siburt, Suzanne Kimball-Brown & Lucretia Kelly (Cahokia Mounds State Historic Site)

[406] ARCHAEOLOGICAL EDUCATION VS THE RAIDERS OF THE LOST ARK AND THE WANNABIES.

Increasingly, programs in archaeology and Indian culture are being offered by a variety of institutions including children's museums, science centers, natural history museums, and archaeological sites. A

fictional, oversimplistic view of archaeology and Indian culture continues to be perpetuated by movies like *Raiders of the Lost Ark* and *Dances with Wolves*. To counter this distortion of history, archaeological sites need to examine carefully the educational programs conducted in schools and at their own sites. This session offers the Cahokia Mounds 1992 Indian Diversity program as a model of Indians, archaeologists, and museum personnel working together towards this goal.

Kutterer-Siburt, Suzanne & Lucretia Kelly (Cahokia Mounds State Historic Site)

[106] PRACTICUM: CAHOKIA MOUNDS AND THE ST LOUIS SCHOOLS: PARTNERS IN EDUCATION.

The Cahokia Mounds educational program brings archaeology into the classroom and the classroom out to the site. This unique program not only gives students the opportunity to explore the past, but also brings students from divergent backgrounds together in a positive experience. This presentation expands upon the lecture material by audience involvement through the use of the materials developed in the Cahokia Mounds, Partners in Education program.

Kutterer-Siburt, Suzanne (see Kelly, Lucretia) [106]

Kuznar, Lawrence (Indiana-Purdue-Fort Wayne)

[510] THE ETHNOARCHAEOLOGY OF ANDEAN RITUAL SITES: A VIEW FROM MOQUEGUA, PERU.

Although prehistoric Andean ritual sites often are accompanied by large, obvious monumental architecture, this may not always be the case, nor are the associated physical remains necessarily well understood. An ethnoarchaeological investigation of currently used Andean huacas was conducted in the department of Moquegua, Peru, in order to establish criteria for what types of remains are deposited at ritual sites, and what taphonomic processes affect these remains.

Kwas, Mary L (Memphis State)

[406] ARCHAEOLOGICAL PARKS: YEAR-ROUND CENTERS FOR PUBLIC EDUCATION.

Because archaeological parks interact with the public on a daily basis and, as tourist attractions, reach audiences from diverse backgrounds and ages, these sites provide a unique and on-going opportunity to educate the public about archaeology. Many archaeological parks have a long history of providing public education, and their range of activities and services reflects a creative approach to delivering their message. Support from professional archaeologists is needed to overcome problems and enhance the educational functions of archaeological parks. Examples from Chucalissa and Pinson Mounds are used.

LaBianca, Oystein (Andrews)

[414] THE MADABA PLAINS PROJECT AND THE AIMS OF INTERPRETIVE ARCHAEOLOGY.

After three decades of ascendancy, the processualist vision of the aims of archaeology has come under severe attack. This vision is being criticized for, among other things, disempowering and alienating the voices of ethnic minorities and women in telling stories about the past. This paper chronicles the evolution over the past three decades of the research design of the Madaba Plains Project, Jordan. In doing so, the focus is on evaluating the project's goals and accomplishments in light of the aims of processualist and interpretive archaeology. The implications of this experience for the debate over the goals of archaeological research are set forth.

Ladefoged, Thegn (Hawai'i-Manoa)

[511] THE EFFECT OF LANDSCAPE DYNAMICS ON ROTUMAN POLITICAL STRUCTURE.

Partially in response to a differential distribution of resources, prehistoric Rotuma (Fiji) developed a distinctive political system which integrated various districts into a rotating kingship. Late Pleistocene lava flows created large areas that were unsuitable for the production of the primary cultigens. More recently, human as well as naturally induced geomorphic processes have further altered the island's resource potential. An environmental analysis using a geographic information system that integrates geoarchaeological, remote sensing, ethnohistorical, and archaeological data demonstrates the various ways in which the political system is uniquely suited to the resource base.

Lanata, José Luis (Texas-Austin)

[212] PEOPLING THE FAR SOUTH AMERICAN TIP.

The first Patagonians are assumed to be Paleoindians or megafaunal hunter-gatherers. Recent research carried out by Borrero and the author has varied this traditional point of view. This paper discusses the evidence for early sites at both Magellanes Strait margins, embracing an evolutionary perspective.

Lambert, Dean (see Fowler, William R) [610]

Landon, David (Michigan Tech)

[612] ZOOARCHEOLOGICAL EVIDENCE FOR FOOD SUPPLY AND DISTRIBUTION SYSTEMS IN COMPLEX SOCIETIES: AN EXAMPLE FROM COLONIAL MASSACHUSETTS.

This paper is a comparative analysis of over 11,000 bones from two urban and two rural historical sites in eastern Massachusetts. Explicit hypotheses are evaluated about how the urban environment and particular characteristics of food supply and exchange systems might affect specific aspects of faunal assemblage patterning. Taxonomic representation, body part representation, butchery patterns, and age and seasonal slaughtering patterns are all interpreted. The results of the analysis suggest that urban food supply and distribution systems followed traditional rural patterns.

Larick, Roy (Bement School)

[608] SPATIAL SCALE IN PALEOLITHIC STONE TECHNOLOGY: THE LATE SOUTHERN PERIGORD.

Concepts for operational sequence in stone technologies must encompass spatial scale. Region-wide movements for chert packages (from raw blocks to finished implements) reflect complex socioeconomics in global sequences. By chance, the geological structure of the Périgord (France) distributes chert sources into two geographic zones. A central zone holds most sources for common cherts (and most Paleolithic sites). A peripheral zone holds fewer but better sources (and fewer but more specialized production sites). Representation of chert types for exhausted late Solutrean (ca 18 kyr) foliate points at central and peripheral sites suggests patterns of circulation for chert packages between zones.

Larson, Mary Lou (Wyoming)

[404] TOWARD A HOLISTIC ANALYSIS OF CHIPPED STONE ASSEMBLAGES.

A holistic approach to the analysis of chipped stone assemblages that integrates separate analyses of tools and debitage allows a much more in-depth consideration of prehistoric technological organization than conventional studies that use tools or debitage alone. The technique of minimum nodule analysis allows a consideration of chipped stone acquisition, production, use, and discard activities, and provides one measure of the flow of matter, energy, and information across the archaeological landscape. Comparison of results from the minimum nodule analyses of two high altitude archaeological sites in the Central Rocky Mountains provides an example of this approach.

Latady, William R (see Doering, William) [410]

Leach, Elizabeth K (Michigan)

[611] GEOARCHAEOLOGICAL SIMULATION OF WESTERN KENTUCKY MIDDLE AND LATE ARCHAIC SETTLEMENT PATTERNS.

A simulated archaeological record is created to examine the interplay among geologic, botanical, and anthropological factors controlling settlement patterns in western Kentucky's Middle and Late Archaic. The simulation results are compared to the results of archaeological survey by the Lower Cumberland Archaeological Project. The comparison suggests that apparent differences in settlement patterns between the periods are a result of responses by a single settlement system to changing botanical and hydrologic conditions from the Middle to Late Holocene.

Lebo, Cathy J (Indiana)

[210] SUN, RAIN, SEED, AND PERHAPS HARVEST: AGROCLIMATIC VARIABILITY IN THE PREHISTORIC AMERICAN SOUTHWEST.

Recent archaeological investigations in the American Southwest challenge traditional notions of when corn agriculture was adopted, why it was adopted, and how important it was in prehistoric diets. The adoption and persistence of corn agriculture, however, cannot be understood apart from the climatic conditions favorable to corn growth and development. A method is presented for agroclimatic reconstruction from tree-ring width indices that demonstrates the level of variability in corn yields over time in the northern Southwest. It also provides a much needed standard, crop shortfalls from normal harvests, making preliminary regional comparisons possible.

Lee, Carla & Rebecca Storey (Houston)

[602] BIOARCHAEOLOGY AND HUMAN ADAPTATION AT AN ELITE COMPOUND, COPAN.

The bioarchaeological study of human skeletons is addressing a wide variety of aspects of the human adaptation to the Copan Valley that can be best answered by skeletal analysis. After discussing the overall research goals of the bioarchaeological study, we concentrate on two types of analysis that provide evidence on how well the human population was thriving in its society and environment—the age distribution of deaths and paleopathological indicators of stress during childhood. The implica-

tions of the evidence from these analyses based on an elite sample for the population's adaptation to the valley are discussed.

Lehner, Mark (Chicago)

[308] THE ARCHAEOLOGY OF THE GIZA PLATEAU.

How were the people who built the great pyramids at Giza organized? Where were they housed? What were they fed? Detailed mapping and selective excavation at Giza since 1977 have begun to expose glimpses into the daily life on the Giza Plateau before, during, and at the height of monumental building projects in the fourth dynasty. This paper reviews the current state of research into the organization of the plateau and the sequence of occupations.

Lekson, Stephen H (Museum of New Mexico)

[403] HOW GREAT WERE SOUTHWESTERN "GREAT TOWNS"?

The spectacular settlement architecture of the American Southwest shapes the theoretical understandings derived from that archaeological base. Appealing visual qualities of southwestern building may obscure more relevant dimensions—size, duration, complexity, and density. This paper examines these characteristics in a wide sample of southwestern sites, and evaluates them on cross-cultural scales.

Lekson, Stephen H (Museum of New Mexico) [Discussant 502]

Leanstrom, Heidi (Minnesota)

[111] SPATIAL EXPRESSIONS OF NATURAL AND SOCIAL ENVIRONMENTS: AN ANALYSIS OF INTERNAL SITE STRUCTURE OF PANCÁN, PERU.

This paper concerns the relationship between people and plants during the occupation of a prehistoric village in the central Andes. A contextual approach explores the environmental adaptation of the Sausa people, the indigenous perception of the landscape, and the effects of social structure on the use and discard of plant materials. I suggest that the relationship between the people and their environment is interactive. Attitudes towards the outside world, and wild and domesticated plants are seen to change through time, in concert with changes in the use and discard of animal bones and household objects.

Lentz, David (Mississippi-Jackson)

[407] MACROBOTANICAL REMAINS AS INDICATORS OF ANCIENT AGRICULTURAL PRACTICES AND ENVIRONMENTAL CONDITIONS.

The analysis and interpretation of botanical macroremains from Mesoamerican archaeological deposits can provide essential data concerning both ancient subsistence practices and paleoenvironments as well. Carbonized plant domesticates furnish evidence regarding crop production, trade interactions, consumption, and food processing, while the remains of wild plants offer insights into dietary supplementation, medicinal and ceremonial practices, seasonality, plant communities targeted for exploitation, and the nature of the communities themselves. Archaeological charcoal has great potential as a data source for paleoenvironmental reconstruction. Although macrobotanical analysis offers a wealth of interpretive information derived directly from artifacts buried in the ground, these data are best utilized when synthesized with data from other avenues of investigation.

Leonard, Robert D (see Jones, George T) [203]

Leonard, Robert D (see Abbott, Alycia L) [304]

Leonard, Robert D (see Reed, Heidi E) [304]

Léotard, Jean-Marc (see Straus, Lawrence) [211]

Lepper, Bradley T (see Otto, Martha) [406]

LeTourneau, Philippe (New Mexico)

[710] FOLSOM RAW MATERIAL USE ON THE SOUTHERN HIGH PLAINS.

I test three specific hypotheses concerning the use of Alibates Agate, Edwards Plateau Chert, and Tecovas Jasper for Folsom technology on the southern High Plains. I test the commonly held notion that the amount of raw material will vary inversely with distance from source. I test this first for whole assemblages, and second for specific artifact classes (channel flakes and Folsom points). Finally, I test the hypothesis that there is a relationship between raw material type and the same two artifact classes. I argue that different relationships for each material type reflect different mobility patterns and/or technological requirements.

Letts, Kelly A (Windrose Consulting) & Jeanne Moe (BLM)

[106] PRACTICUM: INTRIGUE OF THE PAST, A SECONDARY EDUCATION PROJECT.

Intrigue of the Past teaches many Utah core curriculum objectives through the use of archaeological concepts and problems as the theme. The use of archaeology and the scientific method are used to

solve problems through the hands-on approach to learning. This session is a hands-on exploration of a portion of the Intrigue of the Past curriculum.

Letts, Kelly A (see Moe, Jeanne) [106]

Leveillee, Alan D (Public Archaeology Lab)

[709] TERMINAL ARCHAIC TO WOODLAND SOCIAL SYSTEMS ALONG COASTAL SOUTHEAST NEW ENGLAND: A VIEW FROM THE JOYNER SITE.

The social systems and ideologies of prehistoric inhabitants of coastal southeastern New England are considered through an examination of the archaeological record of the Narragansett Bay region. Discussion focuses on the contributions of recent excavations at the Hoskin's Park, South Wind, and Joyner sites.

Levy, Janet E (North Carolina-Charlotte)

[708] STYLE AND TECHNOLOGY OF DANISH BRONZE AGE METALLURGY.

The metal objects from the Danish Bronze Age were made from imported raw materials; many were decorated with engraved anthropomorphic, zoomorphic, and geometric designs which appear to express symbolic information. Many are found in contexts suggesting ritual activity. The interconnections between technical requirements of manufacture and stylistic requirements of ritual communication in the prehistoric case are analyzed in a sample of bronze ornaments worn by women. Following the work of Heather Lechtman and Mary Helms on "style in technology," the manipulation of metallurgy to express status and gender is discussed.

Lewarch, Dennis E (LAAS)

[208] LATE POSTCLASSIC OBSIDIAN ARTIFACT PRODUCTION AND EXCHANGE IN THE COATLAN DEL RIO VALLEY, MORELOS, MEXICO.

Surface collections from eight Late Postclassic sites in the Coatlan del Rio Valley, western Morelos, provide an assemblage of over 5000 obsidian artifacts to analyze production and exchange patterns. Primary manufacturing of green obsidian cobbles is concentrated at site CDR27, which is comprised of dispersed house-patio complexes with associated workshops. Analysis of valley-wide obsidian distribution patterns by house complex demonstrates exchange patterns partially conditioned by household size and location. Extant models of Late Postclassic obsidian artifact production and exchange in Central Mexico are compared to the Coatlan data set and evaluated.

Lewenstein, Suzanne, Angeles Alonso & Raquel Peña (Universidad de las Americas-Puebla)

[510] CERAMICS PAST AND PRESENT IN SIERRA TARAHUMARA: A CASE STUDY IN ETHNOARCHAEOLOGY.

The interpretation of archaeological materials from twenty southwestern Chihuahuan sites located during a 1991 survey by the Proyecto Arqueológico-Etnoarqueológico Sierra Tarahumara is complicated by recent or ongoing occupation at most of the sites, by Tarahumara families and their herds. A study of 90 modern ceramic vessels from four different Tarahumara communities, in both the high sierra and the canyon country, attempts to establish criteria for (1) distinguishing between archaeological and recent pottery, and for (2) identifying ceramic forms, functions, and regional variability from sherd.

Lewis, Brandon (UCLA)

[209] LATE CLASSIC MAYA ECONOMIC INTEGRATION: PERSPECTIVES FROM THE LITHIC PRODUCTION SYSTEM AT RIO AZUL, GUATEMALA.

The nature of Maya economic integration has been the focus of much recent debate. Central to this debate is the degree to which the Maya exhibited centralized administrative control over production and/or exchange activities. Current excavations at Rio Azul, Guatemala, provide data to address these issues. This paper examines Maya economic integration as suggested by the organization of its lithic production system. Variations in stone tool production/use at the household level, along with data from the local lithic deposits (workshops/dumps), provide the basis for this analysis.

Lewis-Johnson, Lucy (Vassar)

[608] ALEUTIAN MARITIME HUNTING STRATEGIES.

Peter Bleed has drawn a distinction between reliable and maintainable technologies, which to some extent parallels Lewis Binford's distinctions between collecting and foraging strategies. While both of these formulations are useful, they have shortcomings when applied to maritime hunter-gatherers, particularly those of the high latitudes. The constraints of the environment—hunting over the sea, very limited industrial resources, high seasonality—require a unique mix of strategies for successful exploitation. In examining the mix developed by the prehistoric Aleuts, the ways that human decision-making is constrained by the ecological conditions people face can be better appreciated.

Lewis-Williams, James David (Witwatersrand) [Discussant 303]

Leyden, Barbara (South Florida) & Mark Brenner (Florida)

[407] REFORESTATION OF LOWLAND GUATEMALA AFTER EUROPEAN CONTACT.

Pollen, charcoal, and geochemical data are presented for three savanna lakes from the Petén district, Guatemala. Shallow *aguadas* filled after ca 300 BP (calibrated age AD 1430-1660), concurrent with regional reforestation. This timing correlates with indigenous depopulation following European contact and the climatic events of the "Little Ice Age" rather than the Classic Maya collapse. Postclassic population pressures and prevailing climatic conditions were sufficient to suppress reforestation. Conversely, deforestation of the Petén ca 3200 BP may have coincided with increased regional aridity. Thus, Mayan events may be more closely linked with climatic factors than previously assumed.

Leyden, Barbara (see Dahlin, Bruce H) [407]

Lieberman, Daniel E (Harvard)

[506] WERE THE NATUFIANS "SEDENTARY"?

This paper examines diversity in mobility strategies during the late Epipaleolithic of the southern Levant. Evidence for reduced mobility from various kinds of faunal data, including seasonally deposited incremental tissues in gazelle teeth, are examined from a wide array of Natufian, Geometric Kebaran, and Kebaran sites in the southern Levant. While mobility patterns during the Natufian appear to be less residentially mobile than those of previous cultural complexes, it is argued that the Natufians cannot necessarily be classified as "sedentary." It is argued that hunter-gatherer mobility strategies are rarely static, and that from a heuristic perspective, sedentism is an elusive if not tenuous concept.

Limp, Fred (Arkansas Archaeological Survey)

[413] GEOGRAPHIC INFORMATION SYSTEMS (GIS) IN HISTORIC PRESERVATION.

GIS systems are an important emerging technology for the historic preservation community as they permit improved research, inventory, and management. This paper considers a number of specific examples of the use of GIS, including: (1) improved identification (survey) methods as a result of improved spatial sampling; (2) discovery of multi-variate patterning in site characteristics; and (3) improved capabilities to provide distributional information through interactive map queries and automated distribution mapping. It summarizes how GIS fits into the suite of related methodologies and examines institutional and organizational requirements for successful applications to archaeology.

Lincoln, Thomas R (see Czaplicki, Jon S) [702]

Lindauer, Owen (Arizona State)

[701] A CONSIDERATION OF MOUNDS AND MOUND COMMUNITIES IN THE TONTO BASIN AS EVIDENCE OF SOCIOPOLITICAL DEVELOPMENT.

Platform mounds and their associated communities are the tangible representations of coordinated labor and management functions associated with social complexity. Arizona State University's investigation of three mound communities in Arizona's Tonto Basin provide examples of how sociopolitical development can be documented. Documentation for sociopolitical development consists of variation in mound size, location, and function. Information from residential communities surrounding mounds complements evidence for labor coordination found at mounds. Schoolhouse mound and its surrounding communities serve as a case study. Comparisons of this and other mounds outside the basin link local developments to a larger pattern of complexity in southern Arizona.

Lindly, John (Arizona State)

[211] THE ORGANIZATION OF LITHIC TECHNOLOGY IN THE ZAGROS MOUSTERIAN OF SOUTHWEST ASIA.

For decades the lithic industry of the Zagros Mousterian has been characterized as a group of homogeneous assemblages dominated by heavily retouched scrapers. This view is changing as data become available from previously unanalyzed sites and as the research emphasis shifts from retouched tools to analyses of entire assemblages. Utilizing such an approach to lithic data that emphasizes both technology and typology provides insights about these industries that lead to a better understanding of the Middle Paleolithic of the Zagros region and clarifies relationships with nearby regional Mousterian industries.

Lipe, William D (Washington State) [Discussant 205]

Lipe, William D (Washington State) [Workshop 401]

Lipe, William D (Washington State) [Discussant 702]

*Lippert, Dorothy (Texas)***[112] CULTURAL CONFLICT AND THE REBURIAL ISSUE: AN ANALYSIS BY A NATIVE AMERICAN ARCHAEOLOGIST.**

This paper examines different facets of the reburial issue and attempts to show why many reasonable-sounding solutions are actually unworkable. The author attempts to provide personal insights into the emotional aspects of the issue. This problem must not be reduced into a "Science vs Religion" dispute because such a quarrel cannot easily be resolved. Instead, archaeology should work harder at understanding the feelings of Native Americans toward the profession. Instead of merely working at getting more Native Americans into archaeology, perhaps we should try to get more archaeologists involved in Native American culture.

*Little, Barbara J (Maryland)***[606] GENDER, SPACE, AND VISIONS OF FREEDOM.**

The use of space is a traditional archaeological concern; the explicit consideration of gender is relatively new. This paper considers recent literature on gender and space in interpreting the changing built environment at the Port Tobacco Carmel in southern Maryland. The Carmelite cloister was established in 1790, removed in 1831, and recently reestablished. Occupied solely by women religious and the slaves they employed to run the cloister plantation, the site provides a complicated historical setting in which to examine interrelated material culture of patriarchy, gender, slavery, Catholicism, and the regional dynamics of southern Maryland in the early 19th century.

*Little, Keith (see Holstein, Harry O) [310]**Loendorf, Lawrence L (North Dakota)***[303] THE USE OF TRADITIONAL ARCHAEOLOGY IN ROCK ART RESEARCH.**

Traditional archaeological methods can be useful in studying rock art. Excavation at the base of rock art panels has produced the tools used in making the paintings, and the analysis of pollen samples from rock art sites suggests an array of plants were used at them, including the mix of herbs often found in a shaman's medicine bundle.

*Loendorf, Lawrence L (see Conner, Stuart) [208]**López Luján, Leonardo (INAH, Museo Templo Mayor)***[706] AZTEC DEDICATION AND TERMINATION CACHES.**

Between 1978-1989, the Templo Mayor Project/INAH discovered 110 buried offerings in the heart of Mexico City. Archaeologists have recorded compositional and spatial distribution patterns of the artifacts within the offering receptacles, and of the buried offerings related to the buildings and sculptural monuments. This patterned distribution obeys to a code of religious expression linked to specific ritual behaviors. After a numerical taxonomy classification, and the comparison of the archaeological data with historic, iconographic, and ethnographic information was done, we were able to define some groups of offerings buried in termination and dedication ceremonies.

*López Varela, Sandra L (London)***[706] SYNCRETISM IN THE MAYA NORTHWESTERN LOWLANDS: A CASE STUDY THROUGH THE CERAMIC ANALYSIS OF POMONÁ, TAB.**

The excavated buildings at Pomoná revealed a particular ceramic assemblage which is related to the Teotihuacan withdrawal of the Maya area. At the same time this indicates the presence of mixed groups into the northwestern lowlands, giving a defined identity to this region during the Late and Terminal Classic, due to its increasing political and economic power.

*Lorenz, Karl (Gettysburg)***[310] A COMPARISON OF TWO-TIERED MISSISSIPPIAN SETTLEMENT SYSTEMS WITH THE LARGER THREE-TIERED SYSTEMS IN SOUTHEASTERN NORTH AMERICA.**

Results from a settlement pattern survey as well as from excavation at selected late prehistoric Mississippi period sites in the Big Black Valley of Mississippi are described, and comparisons are made with southeastern settlement systems at a similar two-tiered hierarchical scale. A preliminary model is presented for the operation of such small-scale societies with respect to patterns of settlement, subsistence, sociopolitical organization, and long distance exchange. This model is then compared to the existing model of the three-tiered complex Mississippian chiefdoms in order to support the argument that the late prehistoric period Southeast did not consist of a homogeneous group of complex chiefdom level societies, but also included the less complex big man type societies, which coexisted side by side with the complex groups.

*Lothrop, Jonathan & Brad Koldehoff (Louis Berger & Associates)***[404] TECHNOLOGICAL ORGANIZATION AND SETTLEMENT MOBILITY: A CRITICAL EVALUATION.**

Recently, a model of prehistoric technological organization for North America that correlates decreased residential mobility with a shift from bifacial to expedient core technology has gained currency. This paper critically evaluates aspects of this model. It is argued that, for certain periods of prehistory, the model is inaccurate and overly simplistic in its characterization of technological organization. Further, it is suggested that other variables besides mobility must be considered in explaining changes through time in the organization of prehistoric technologies.

*Lovis, William A & Kathryn C Egan (Michigan State)***[204] STRATEGIES FOR MAIZE HORTICULTURE IN MARGINAL ENVIRONMENTS: A SAGINAW VALLEY PERSPECTIVE.**

Marginal environments vary significantly in their effects upon horticultural systems. The application of social, spatial, and economic models derived from optimal economic contexts to marginal regions poses problems of preconceived systemic structure. This paper evaluates the fit of alternative spatial, settlement, and population centralization models to the horticultural transformation of the Saginaw Valley Late Woodland. The primary issue addressed is the relative value of centralization to economic risk management in this marginal environment. It is argued that marginal environments allow for a range of alternative settlement strategies to be employed in maize horticultural systems.

*Lovis, William A (Michigan State) [Workshop 401]**Luedtke, Barbara E (Massachusetts-Boston)***[709] SURF AND TURF: LATE WOODLAND USES OF THE BOSTON HARBOR ISLANDS.**

Late Woodland people used the numerous small islands in Boston Harbor primarily for fishing and hunting camps, although farming and the manufacture of stone tools, bone tools, and pottery also took place. This paper deals with the food remains found at these sites. Although a wide range of species has been recovered, Late Woodland people appear to have focused especially on a limited number of resources. Possible reasons for these choices are explored.

*Lundberg, Emily R, Elizabeth C Righter (SHPO-Virgin Islands) & Margaret D Caesar***[503] LATE CERAMIC AGE OCCUPATION IN THE NORTHERN VIRGIN ISLANDS.**

Among the eight major islands comprising this group, there are great disparities in amount of archaeological information. Surveys on three islands, however, indicate an increase in settlements from Saladooid to post-Saladooid times. Available data from site excavations include examples of dated stratigraphic assemblages, burials, and house patterns. Although late Ceramic Age pottery generally conforms to the Elenan or Esperanza Ostionoid subseries present on Puerto Rico, the northern Virgin Islands lack large ceremonial or settlement centers and the quantities of elaborate goods found on Puerto Rico. This is consistent with participation in an extractive and hierarchical social system.

*Lupo, Karen D (Utah)***[215] THE ZOOARCHAEOLOGICAL RESOLUTION OF ANIMAL BODY PART TRANSPORT: LESSONS FROM THE HADZA OF EAST AFRICA.**

Observations of animal body part transport decisions by modern East African Hadza hunters were made for a variety of prey taxa. These observations are compared to the skeletal part frequencies from five bone assemblages produced by the Hadza. The results show that the observed body part transport patterns are best reflected in single carcass, small bone assemblages and are obscure in large bone assemblages created when several carcasses are butchered. The zooarchaeological implications of this study are discussed.

*Lycett, Mark T (New Mexico)***[711] ON CERAMIC FRAGMENTATION AND ARCHAEOLOGICAL LANDSCAPE FORMATION.**

Ethnoarchaeological and experimental studies have demonstrated that the size of an artifact plays a primary role in its discard, deposition, and incorporation into archaeological deposits. Both geomorphological and cultural formation processes act on items in relation to their size, shape, and mass. One result of these processes is continuous postdepositional sherd comminution. Ceramic fragmentation provides a means of addressing redundancy in the use and reuse of locations on archaeological landscapes formed through multiple, overlapping patterns of deposition. This paper examines spatial variability in the size and weight of ceramics collected from the Galisteo Basin, New Mexico, to evaluate measures of ceramic fragmentation and their application to the study of land use systems.

Lyman, R Lee (Missouri-Columbia) [Discussant 508]

Lynch, Thomas F (Cornell) & Christopher M Stevenson (Archaeological Services Consultants)
[305] OBSIDIAN HYDRATION DATING AND TEMPERATURE CONTROLS IN THE PUNTA NEGRA REGION, CHILE.

Effective hydration temperature (EHT) is essential for the computation of obsidian hydration dates. In the Atacama Desert the scarcity of air-temperature records combines with extremes of elevation and temperature to require the use of buried thermal cells to record on-site mean annual temperatures. Compositional analysis (sourcing) and hydration rate development also are necessary, especially where other dating methods are unavailable to confirm the hydration rate. Paleoindian or Early Archaic through modern obsidian dates support a human settlement pattern history derived from archaeological/geomorphological studies of climatological and hydrological change.

Lynott, Mark (National Park Service)
[509] THE EVIDENCE FOR EMERGENT MISSISSIPPIAN OCCUPATION IN THE EASTERN OZARKS.

Recent research in the eastern Ozarks has produced evidence of widespread Emergent Mississippian occupation beginning about AD 700. Emergent Mississippian development is manifested in the appearance of shell-tempered ceramics, arrow points, and rectangular wall trench houses. Despite these cultural innovations, settlement and subsistence patterns reflect continuity with well established practices in this region. High inter-site variability during the Emergent Mississippian substage is interpreted as evidence of local autonomy. About AD 1300, there is evidence that Emergent Mississippian people abandoned the eastern Ozarks, probably to participate more fully in the newly forming chiefdoms of southeast Missouri.

Madsen, Mark (Washington)
[302] DEFINING CONTEMPORANEITY IN THE ARCHAEOLOGICAL ANALYSIS OF SETTLEMENT PATTERNING: AN EXAMPLE FROM THE OHIO HOPEWELL.

When analyzing settlement patterns or community organization, archaeologists must either demonstrate or assume that deposits being compared were synchronous. Typically, contemporaneity is often assumed or poorly demonstrated, because the concept is underanalyzed in archaeology. Contemporaneity is defined, and techniques for assessing it are discussed, including appropriate dating methods. Finally, the techniques outlined are demonstrated using data from a dispersed Hopewell community in Ohio. Thermoluminescence dates from domestic locations form the basis for determining the occupational history of one community and permitting analysis of organizational change.

Magness-Gardiner, Bonnie (Bryn Mawr)
[507] TAXATION AND THE SMALL STATE IN BRONZE AGE SYRIA.

The organization of tax collection is one way of looking at distinctions between small states and large states. The textual evidence for taxation at Mari, a large mid-2nd millennium BC state on the Euphrates River, and Alalah, a small state near modern Aleppo, reveals patterns that differ in both magnitude and complexity. The political and archaeological implications of these patterns are discussed.

Maines, Clark (Wesleyan) & Sheila Bonde (Brown)
[408] MONASTIC SETTLEMENT IN THE DIOCESES OF LAON AND SOISSONS, FRANCE, AD 1050-1200.

Monasteries constituted an enduring component of medieval settlement. This paper examines the relationship between monastic sites (including their dependent holdings) and previous occupation history. It considers disruptions in climate, advances in agricultural technique, and shifts in landholding patterns as factors in settlement change. Between 1050 and 1200, the dioceses of Laon and Soissons absorbed three new reform orders that settled old and new lands in different ways. Some sought deserted rural sites, while others settled near towns. All three orders vied for property in the former chalk deserts newly discovered to be suitable for viticulture. In this paper, we not only trace the spatial distribution of monastic settlement, we lay the framework for evaluating continuities and discontinuities in high medieval settlement.

Malinowski, Lynn M (see Haley, Shawn) [210]

Malpass, Michael (Ithaca)
[610] ARCHAEOLOGICAL RECONNAISSANCE IN THE UPPER CAMANA VALLEY, PERU.

Archaeological reconnaissance in the upper Camana River Valley resulted in the discovery of several new sites. The most significant were three large sites: one was a Wari center with a later Inka occupation, the second was a substantial Inka site, and the third was a large architectural site of uncertain cultural affiliation. Only five other sites were recorded; three had architecture and late prehistoric ceramics, while the other two had structures but no artifactual remains on the surface.

Preliminary results suggest intensive utilization of this section of the Colca-Majes-Camana drainage from Middle Horizon times onward.

Mandel, Rolfe (Nebraska-Omaha)
[710] GEOARCHAEOLOGY OF A DEEPLY STRATIFIED PALEOINDIAN THROUGH LATE PREHISTORIC SITE (41BX831) IN THE MEDINA RIVER VALLEY, SOUTH TEXAS.

Excavation of a 15-m-deep trench across a broad alluvial terrace of the Lower Medina River in south Texas exposed well-preserved, deeply stratified cultural deposits (Site 41BX831) representing all of the major cultural periods of the Holocene and terminal Pleistocene. The cultural horizons were associated with four buried soils developed in fine grained flood deposits. An assemblage of more than 30 radiocarbon ages determined on charcoal and soil humates places the cultural materials into a well defined chronostratigraphy. This paper summarizes the soil stratigraphic record at 41BX831 and considers site formation processes.

Mandryk, Carole (Alberta)
[208] HUMAN VIABILITY OF THE LATE- AND POST-GLACIAL ICE-FREE CORRIDOR OF WEST CENTRAL ALBERTA.

The human viability of the late- and post-glacial ice-free corridor is tested. A regional vegetation record extending back to 18,000 BP is reconstructed for the upper North Saskatchewan drainage basin. These data, integrated with reconstructed landscape characteristics, provide a context for the evaluation of human cultural systems. Calculations of harvestable primary production, prey biomass, and optimum yield available to humans are shown to be below the minimum nutritional needs of a socially viable population in the linearly constricted environment of the corridor from 18,000 to 13,000 BP. Therefore, the ice-free corridor was not a viable human environment prior to approximately 12,000 BP.

Manson, Joni L
[311] HEATING EFFECTIVENESS OF NEOLITHIC POTTERY.

It has been suggested that as a population's reliance on cultigens increases, pottery vessels will be modified to be better suited to cooking. Thus, changes in ceramic attributes related to heating effectiveness may indicate increasing use of domesticated plant foods. Tempering, thickness, and other attributes which influence thermal diffusivity and thermal shock resistance are particularly important in studying the heating effectiveness of ceramics. Sherds from Neolithic (Starcevo) sites in Yugoslavia were analyzed in terms of their thermal-performance characteristics. Methods and results of the analyses are described, and implications for settlement and subsistence practices in Neolithic Yugoslavia are discussed.

Manzanilla, Linda (Instituto de Investigaciones Antropológicas, UNAM)
[505] SOCIOECONOMIC VARIATIONS IN APARTMENT COMPOUNDS AT TEOTIHUACAN: A RECONSIDERATION.

Current detailed research at one apartment compound in the northwestern fringe of the Classic city of Teotihuacan sheds new light on the patterning of activities of individual family units residing within the compound. Special attention is given to the question of inter- and intra-family craft specialization, as well as the differential access to geological, botanical, and faunal resources. These unique data serve as the basis for a reconsideration of the patterning of socioeconomic activities within other excavated apartment compounds in ancient Teotihuacan.

Markman, Charles (Missouri-St Louis)
[707] NEW PERSPECTIVES ON THE WOODLAND PERIOD: RECENT RESEARCH RESULTS FROM THE UPPER MISSISSIPPI DRAINAGE.

Our perspective on the Woodland period in eastern North America has vastly changed in response to new data and analytical approaches, particularly in the area of prehistoric subsistence, the relationship between subsistence, technology, and cultural elaboration, the role of environmental adaptation in shaping culture, and the role of trade and exchange within an overall adaptive strategy. This paper reviews recent research focusing on the period 500 BC and AD 1000 in light of an evolving long term river basin research program sponsored by the Corps of Engineers.

Marks, Anthony (Southern Methodist) [Workshop]
[201] THE GENERAL GRANT WRITING PROCESS.

Marquardt, William H (Florida)
[102] THE EMERGENCE AND DEMISE OF THE CALUSA STATE.

In 1566 Pedro Menéndez met Carlos, king of the Calusa. With Carlos rested the prerogative of life or death over thousands, and the right to receive tribute from towns across south Florida. His people

built earthworks, temples, and waterways. Commoners provided for the nobles and the military. Remarkably, the sedentary, hierarchichal, tributary Calusa were not farmers but fisher-folk. Some argue that the Calusa attained their complexity by AD 800. However, it is also possible that changes in Calusa social and political organization occurred rapidly in the early 1500s, as they were drawn inexorably into the European dominated mercantile/imperial economy.

Marquet, Pablo (see Santoro, Calogero) [305]

Martin, Debra L (see Nelson, Ben A) [210]

Martin, Terrance J, Kenneth B Tankersley & Edward B Jelks (Illinois State Museum)

[612] THE WINDROSE SITE: EVIDENCE FOR ANIMAL EXPLOITATION AT A LATE 18TH/ EARLY 19TH CENTURY HABITATION SITE IN KANKAKEE COUNTY, ILLINOIS.

Investigations in 1991 at the Kankakee River State Park in northeastern Illinois disclosed the presence of a late 18th/early 19th century habitation site. Test excavations at the Windrose site (11Ka318A) revealed both Euroamerican and Native American materials associated with a large assemblage of animal remains. Although artifacts do not allow for a more specific temporal placement, documents clearly indicate the presence of Potawatomi habitation sites in the area. Beyond demonstrating exploitation of local wild animal resources, the faunal assemblage provides insights into acculturation and the local fur trade.

Martinez, Valentina (Southern Methodist)

[710] TOWARD THE RESOLUTION OF THE FOLSOM-MIDLAND PROBLEM.

Since the discovery in 1953 of the first Midland Paleoindian assemblages, there have been questions of their temporal, technological, and typological affinities with better known Folsom materials. Folsom and Midland assemblages are similar, yet in some significant ways, they are quite different. Using stratigraphic and lithic data from eight Folsom-Midland sites, this paper addresses the relationships between these two Paleoindian assemblages on the Southern High Plains. By conducting field excavation and statistical analysis, new information has been obtained that will help us to address a problem that has stubbornly defied resolution for nearly 40 years.

Masson, Marilyn A & Heather Orr (Texas-Austin)

[706] BUILDING DEDICATION, NAHAL TRANSFORMATION, AND CAPTIVE SACRIFICE AT MONTE ALBAN: POLITICORELIGIOUS STRATEGIES OF ANCIENT ZAPOTEC LEADERSHIP.

A comparison of structural attributes of carved monuments throughout Oaxaca reveals that patterns of rulership legitimization were displayed in public ritual. Analogies drawn to recent interpretations from Maya (Schele and Freidel 1990) and Olmec (Reilly 1989, 1991) iconography identify Zapotec participation in an inter-regional Mesoamerican system of ideas and symbols. Oaxacan affinities with this system are expressed in rituals of religion and warfare which include captive-taking, sacrifice, and shaman-like animal transformation. Inter-regional comparisons of recent work breathe new significance into formal patterns of Zapotec politicoreligious iconography, examined here in the archaeological context of building dedication.

Matson, R G (British Columbia)

[205] ANOMALOUS BASKETMAKER II SITES ON CEDAR MESA: NOT SO ANOMALOUS AFTER ALL.

In 1991 I investigated a series of Basketmaker II (BM II) sites on Cedar Mesa that were not clearly BM II, in unusual places, or in environmental locations that were similar to reported late Archaic sites. Limited excavation showed that some were good BM II habitation sites complete with pithouses, albeit in unique settings. Others, interpreted as BM II "campsites" during the regional sampling and surface collection oriented Cedar Mesa project of the 1970s, were found to be associated with diagnostic BM II sandstone slab-lined cists, confirming their initial identification. Finally, one habitation site appears to be the first Anasazi defensive "cliff dwelling."

Matson, R G (see Chisholm, Brian S) [205]

Mauldin, Raymond (New Mexico)

[604] LATE ARCHAIC AND EARLY CERAMIC ADAPTATIONS IN THE NORTHERN CHIHUAHUA DESERT.

Recent research has demonstrated substantial Late Archaic and Early Ceramic occupations in the Chihuahuan desert. This paper uses over 100 recently acquired radiocarbon dates from sites in west Texas to document a fluctuating pattern of land use. These dates demonstrate extensive reuse of areas, with high levels of occupation during both time periods. Many of these sites represent short term use by small, highly mobile groups. Floral, faunal, architectural, and artifactual data from

extensive excavations conducted at several sites are compared to better define the subsistence/settlement systems represented by these periods, and to assess explanations for changes between periods.

Meuricio, Rufino (see Ayres, William S) [508]

Maxwell, Timothy D (Museum of New Mexico)

[203] THE USE OF TEMPORALLY RESTRICTED DATA IN EVOLUTIONARY STUDIES.

Archaeologists are often faced with temporally restricted data bases that have a regional distribution. When confronted with a lack of time depth, how can archaeologists examine adaptation when such studies require at least some examination of diachronic frequency changes in selected traits? How might we distinguish neutral traits from those subjected to selective processes? Or, how can we evaluate the possible selective processes that may have affected the temporally isolated traits under study? Some potential approaches are examined using data from the North American Southwest. These approaches include ecological studies and engineering analyses that focus on function.

Maymon, Jeffrey H (see Cobb, Charles R) [403]

McAnany, Patricia A (Boston)

[704] ANCESTOR WORSHIP AS AN ORGANIZATIONAL FULCRUM OF LAND TENURE IN THE MAYA LOWLANDS.

Systems of land tenure generally involve the intergenerational transfer of use rights or proprietary control of resources. Linkages with the dead, which are actively and continually expressed ritually, serve to organize and maintain the channels of land transfer. Ancestor worship is one potential indicator of the entrenchment of these channels. The genesis of the practice of "living with the dead" in the Maya lowlands is discussed in the light of recent findings at the Formative site of K'axob. It is suggested that the emergence of social inequality may be linked inextricably to these exclusionary social and economic practices.

McBride, Kevin A (Connecticut)

[709] COASTAL ADAPTATIONS IN EASTERN LONG ISLAND SOUND.

The development and variability of coastal adaptations in eastern Long Island Sound are examined from a temporal and geographic perspective. Archaeological evidence indicates a shift in settlement and subsistence patterns to coastal areas and resources beginning around 600 BC. This phenomenon appears to be associated with the decline in the rate of marine transgression and the development of tidal marshes in the region. Archaeological evidence also suggests a considerable degree of variability among coastal groups with respect to settlement/subsistence patterns and the importance of marine resources in the diet.

McCafferty, Geoffrey G (SUNY-Binghamton)

[208] THE CERAMICS OF POSTCLASSIC CHOLULA, MEXICO.

The ceramic complex of Postclassic Cholula has been among the most influential and controversial in pre-Columbian Mesoamerica. This presentation introduces a revised classification for both decorated and undecorated types that provides an improved means for distinguishing culturally significant variation. Furthermore, seriation analysis of pottery from the UA-1 excavation provides a basis for the critical evaluation of existing ceramic sequences, and a new Postclassic chronology is suggested.

McCafferty, Geoffrey G (see McCafferty, Sharisse D) [313]

McCafferty, Sharisse D (Green Central School) & Geoffrey G McCafferty (SUNY-Binghamton)

[313] ENGENDERING TOMB 7 AT MONTE ALBAN, OAXACA: RESPINNING AN OLD YARN.

A contextual analysis of material culture recovered from Tomb 7 suggests a startling reinterpretation of the gender identification of the tomb's principal individual. Spinning and weaving implements found with the burial, previously interpreted as male, indicate the strong possibility that the individual was female. Finally, the total assemblage, including skeletal remains and costume elements, is considered in reference to the religious and gender ideologies of pre-Columbian Mesoamerica.

McConnell, Brian (Tufts/Brown) & Bruce W Bevan (Geosight)

[108] LA MUCULUFA: THE SPATIAL ANALYSIS OF AN EARLY BRONZE AGE VILLAGE IN SICILY.

La Muculufa is a type-site of Sicily's Castelluccian culture (ca 2000-1500 BC) consisting of a village, a necropolis, and an open air sanctuary set in carefully defined areas along a striking rocky crest. Current research is directed toward the spatial analysis of the village where prior excavation had revealed the existence of 10-m-wide terraces and wattle-and-daub structures. A survey of magnetic and electrical anomalies in the soil across the central area of the village in 1990 was tested through

excavation in 1991 confirming the survey's indications. Continuing fieldwork is directed toward investigating how the planning and design of the village may have emerged from the adaptation of the natural landscape.

McCorriston, Joy (Smithsonian)

[213] ACORN EATING AND AGRICULTURAL ORIGINS: ETHNOGRAPHIES AND MYTHS.

Modern hunter-gatherer groups furnish significant examples of dependence on nuts as critical resources. One of the most important examples is the use of the ethnographic record from California to model Natufian subsistence prior to the emergence of agriculture in the Near East. Late 19th and early 20th century ethnographers left a detailed record of California Indian subsistence, yet this record reflects two hundred years of European and American settlement and land use. By exploring implications of uncritical use of these ethnographies, this paper raises the potential contribution of another body of theory, Evolutionary Convergence, to modeling Near Eastern prehistory.

McCulloch, Tom (Advisory Council on Historic Preservation)

[101] 'AREA OF POTENTIAL EFFECTS' IN THEORY AND PRACTICE.

The determination of the "area of potential effects" is one of the most critical decisions made under Section 106 of the National Historic Preservation Act. It has a significant bearing on the cost and comprehensiveness of all steps carried out in archaeological data recovery, from where to look for sites to decisions about where and how much to dig. This paper examines the potential and feasibility of potential guidelines and standards for determining the APE of a project, in contrast to the present case-by-case manner for making decisions about project impact areas.

McCullough, Robert G (see Redmond, Brian G) [204]

McCutcheon, Patrick (Washington)

[309] AN ARCHAEOOMETRIC STUDY OF LITHIC RAW MATERIAL VARIABILITY IN THE WOODLAND AND MISSISSIPPIAN PERIODS, SOUTHEAST MISSOURI.

Archaeologists have begun to realize that complex secondary deposits, rather than bedrock deposits, are frequently the source of lithic raw materials. The use of such complex deposits in prehistory, however, is poorly understood. Physical analysis of chert properties is used to document changes in the selection criteria employed by prehistoric artisans in exploiting a complex gravel source in southeast Missouri. These criteria are related to changes in the lithic technology.

McEwan, Colin (Art Institute of Chicago)

[301] FOCUSING PRIDE IN THE PAST: ARCHAEOLOGY AND COMMUNITY ON THE COAST OF ECUADOR.

This paper describes the creation of a new village cultural center and museum in the Comuna Agua Blanca on Ecuador's Pacific Coast. The center is a tangible expression of this community's participation in the research, protection, and maintenance of a nearby prehispanic archaeological site. Agua Blanca's rediscovery of its past emphasizes the importance of placing knowledge of, and responsibility for, cultural heritage in the hands of the people who are closest to it.

McFaul, Michael & William Doering (LaRamie Soils Service)

[710] DEFINING SITE-SPECIFIC ARCHAEOLOGICAL POTENTIALS: AN EVALUATION OF A GEOARCHAEOLOGIC APPROACH.

Ranking geoarchaeologic potentials is a cost effective method to evaluate sites and locales having the capability to yield significant archaeological and environmental data. Site/locale ranking employs terrain analysis procedures to group similar landforms and a classification of both site specific surface and subsurface geomorphic and pedologic characteristics. Hierarchical ranking is based upon various attributes that include geomorphic positions (erosional vs depositional), degree of preservation of the soil/sediment record, and availability of resources. Testing of the method within various terrains/environments traversed by an 80-km right of way in north central New Mexico suggests that these quantitative procedures are helpful in designating sites/locales for intensive examination.

McFaul, Michael (see Doering, William) [410]

McGuire, Randall H (SUNY-Binghamton)

[206] THE LIMITS OF WORLD SYSTEMS THEORY FOR THE STUDY OF PREHISTORY.

Immanuel Wallerstein originally proposed world systems theory as a theory to account for a unique event in world history, the rise of capitalism. It has, however, become a totalizing theory that attempts to account for the course of human history in all times and places. The theory does not work well in the prehistoric Southwest, and the problems here may be generalized to other prehistoric cases. I propose that archaeologists alternatively ask about processes of uneven development, at various scales

in specific historical sequences to arrive at understandings of how long range interactions and local developments interrelated in prehistory.

McGuire, Randall H (SUNY-Binghamton) [Discussant 107]

McGuire, Randall H (see Cobb, Charles R) [403]

McKee, Brian R (Colorado-Boulder)

[105] DOMICILE STRUCTURES AT THE CERÉN SITE, EL SALVADOR.

Classic period households of Cerén utilized several functionally specialized structures. The domiciles were used for sleeping, eating, storage, and other activities. They had wattle-and-daub walls, adobe columns, and grass thatched roofs on fired clay platforms. Each had two rooms with raised clay benches in the inner rooms. Extensive roofed areas outside the structures were used for a variety of activities. Evidence of activities conducted at these structures is examined. Cerén structures are compared with modern Mesoamerican and Intermediate Area structures in similar contexts, and archaeological evidence of residential structures in southern Mesoamerica is explored.

McKee, Larry (The Hermitage)

[104] MIDDLE TENNESSEE PLANTATIONS: ON THE PERIPHERY OR AT THE CORE?

This paper examines antebellum-period plantation life in middle Tennessee, and argues that the area formed a distinctive core within the southern US. Questions of how the region's character affected the archaeological record are addressed, with an emphasis on diet, architecture, and plantation layout. Beyond the particulars, the goal here is to encourage a research framework placing more weight on regional structures and experience. Such an approach would force a reconsideration of the common archaeological viewpoint on plantation slavery as a more or less monolithic institution, unvarying from place to place and from time to time.

McKelway, Henry S (Tennessee)

[104] SLAVE AND MASTER IN THE UPLAND SOUTH OF EAST TENNESSEE: ARCHAEOLOGICAL INVESTIGATIONS AT THE MABRY PLANTATION.

Archaeological investigations at the Mabry site (40KN86), a 19th-century plantation located in Knox County, Tennessee, have uncovered material from two slave quarters and several features associated with the master's residence. The Mabry site is located in the Upland South, where historians have suggested unique relationships existed between master and slave. Slave and master relations at the Mabry site are explored through material culture. Primary emphasis is placed upon the ceramics from slave and master contexts which are analyzed using diversity and cost indices. The Mabry site is the first opportunity in east Tennessee to study slave-master relations.

McKillop, Heather (Louisiana State) & Lawrence J Jackson (Northeastern Archaeological Associates)

[610] THE INTEGRATION OF LONG DISTANCE AND LOCAL TRADE AMONG THE MAYA OF SOUTH-COASTAL BELIZE.

Several perspectives on the nature of long distance trade among ancient complex societies are evaluated with reference to the Classic and Postclassic Maya. Specifically, the "port of trade" model is considered in contrast to other trade systems. On-going regional survey and excavations in south-coastal Belize revealed some 25 sites, including the major trading port of Wild Cane Cay. The presence of trade goods at some of these sites indicates more integration of long distance and local economies than expected.

McManamon, Francis P (National Park Service)

[202] MANAGING REPATRIATION: IMPLEMENTING THE NATIVE AMERICAN GRAVES PROTECTION AND REPATRIATION ACT OF 1990.

A variety of actions are needed to implement the Native American Graves Protection and Repatriation Act of 1990. These range from the bureaucratic establishment of a Review Committee mandated by the law, to the development of regulations, to providing training in various aspects of compliance, and administering a grants program. This paper reports the status of these actions and discusses issues related to them.

McManamon, Francis P (National Park Service)

[705] SITE DISCOVERY AND ESTIMATION: RETROSPECT AND PROSPECT.

In order to preserve America's archaeological heritage effectively there must be improvement in the effectiveness with which unknown sites can be located and the frequency and locations of such resources estimated based upon samples of known sites. This is especially difficult in environments in which sites are not easily seen. In some cases probability sampling can help in providing estimates

of resource frequencies and densities. In all cases site discovery techniques that are effective must be used. A specialized repertoire of these techniques is needed for areas where sites are hard to detect.

McManamon, Francis P (National Park Service) [Workshop 401]

McMann, Jean (UC-Berkeley)

[208] LOUGHCREW: DIMENSIONS OF AN IRISH MEGALITHIC LANDSCAPE.

This poster presents some results of an investigation of spatial patterning at Loughcrew, a group of megalithic chambered cairns in County Meath, north-central Ireland. The monuments may have been in use from c. 5000 BC to c. AD 100. An analysis of ground plans of the cairns and site suggests at least two simultaneous organizing principles. To compare the results of this analysis with themes in ancient Irish history, literature, and folklore is to discover some provocative, if not controversial, contrasts and resonances.

McPherron, Shannon (Pennsylvania)

[613] ACHEULIAN BIFACE AND ASSEMBLAGE VARIABILITY: AN EXAMINATION OF NEW DATA FROM NORTHERN FRANCE.

Analysis of new data from excavations at the sites of Gouzeaucourt and Longavesnes and from the reexcavation of the classic Somme Valley sites of Cagny l'Epinette and Cagny La Garenne is changing our traditional notions of chronological change and industrial variability during the Acheulian and early Middle Paleolithic. Neither the frequency of bifaces nor their forms are reliable indicators of an assemblage's age or its affinities with either the Acheulian or the Mousterian. A technological analysis of intact Acheulian assemblages is, however, helping explain variability within the Lower Paleolithic of northern France.

Meadow, Richard H (Harvard) & Anna Curnow (Yale)

[207] FAUNAL EXPLOITATION PRACTICES DURING THE THIRD MILLENNIUM IN THE LOWER TOWN OF TELL LEILAN (SYRIA).

Analysis of faunal remains from the 1989 excavations in the Lower Town of Tell Leilan has provided a first picture of animal exploitation by an urban population during the mid-third millennium BC in North Mesopotamia. The assemblages are dominated by bones of young domestic pig, although sheep, goat, cattle, dog, gazelle, and equid also are represented. This spectrum of animals and other zooarchaeological data in the context of domestic habitation suggests that animal products were available to the population independent of state control over their distribution. Pigs in particular are well suited to husbandry in an urban setting.

Mehrer, Mark (Northern Illinois)

[412] A BURIED ARCHAIC COMPONENT AT THE CRAWFORD LAKE SITE IN WESTERN KENTUCKY.

Recent investigations in western Kentucky have focused on Archaic sites near the Ohio River west of Paducah. One important site is the large multicomponent Crawford Lake site that extends for over a mile along a terrace edge on the banks of a backwater lake. Components there include Late Archaic, Middle Woodland, Late Woodland, and Mississippian. In one portion of the site, test excavations revealed an intact layer of Late Archaic midden disturbed only by an overlying layer of Mississippian features and midden. Archaic features, debris, and a flexed burial were found. Analysis indicates ties to the Helton phase in Illinois.

Mélendez Maíz, Marisol (see Hayward, Michele) [208]

Mendoza, Ruben G (Colorado-Denver)

[411] CHOOLLAN, TAJIN, AND THE OLOMAN CONNECTION: PATTERNS IN THE EVOLUTION OF CIRCUM-BASIN REGIONALISM, AD 550-850.

Recent investigations into the development of Epiclassic-era circum-Basin regionalism indicate that the ancient metropolis of Cholllan, Puebla, was at the heart of a pan-Mesoamerican exchange network. This network, which rivalled that centered on ancient Teotihuacan, aligns with that posited for Robert Zeitlin's (1982) obsidian-based Isthmian exchange model. Gulf Coast-Central Highland exchange patterns, iconographic and architectural conventions, and mortuary data are taken to support Cholllan's proposed role. Preliminary observations indicate that Cholllan's interactions with the Mexican Gulf Coast, circum-Basin Mesoamerica, and further afield, the southern Maya highlands, were sufficient to have eclipsed Teotihuacan's interactions with the corresponding areas.

Mengoni Goñalons, Guillermo (Conicet)

[610] ECONOMIC ANATOMY AND UTILITY INDICES OF THE LLAMA.

Utility indices and available meat percentages were calculated for different body parts of the llama and compared with those of the other South American camelid forms, both wild and domesticated.

A discussion on the importance of the llama as a meat producer follows, as regards to the process of domestication.

Meskill, Frances (Texas-San Antonio)

[411] A PROTOCLASSIC UPDATE: RE-EXAMINING THE ARCHAEOLOGICAL RECORD.

New information, including the documentation of a functionally complete Floral Park complex, is reported, and existing data are re-evaluated in this update of the Maya Protoclassic. Based on the re-examination, the Floral Park phenomenon is viewed from a fresh perspective, reversing earlier theories for abrupt population increase in the Belize River Valley. Within this revised context, a Floral Park connection to evolving social complexity is again posited.

Metcalf, Mary P (Virginia)

[110] PATTERNS OF ARCHITECTURAL CHANGE IN THE NORTHERN SOUTHWEST AD 1000-1300.

Ethnographic and archaeological studies in the northern Southwest have linked architectural patterning with social organization. This study analyzes shifting relations of domestic and public space in order to examine patterns of change and stability in socio-political relations. The research quantifies space within pueblos devoted to different purposes. Kiva to room ratios, volume of space used domestically and publicly, and the ease of access to "public" spaces are compared and contrasted between building episodes of individual pueblos and between pueblos. Data from the Chaco Canyon and Mesa Verde regions between AD 1000 and 1300 are used.

Michals, Lauren M (UC-Santa Barbara)

[508] THE NATURE OF FAUNAL EXPLOITATION DURING THE MOUNDVILLE PHASE.

Past research on faunal material from Mississippian sites has shown there is some degree of status-related differential access to specific portions of deer and to specific species of animals. Analysis of material from the Moundville phase in Alabama suggests that this differential access occurred after Moundville became a complex chiefdom that incorporated the surrounding river valley under its control. The nature of differential access to faunal resources during the Moundville phase, whether this is a form of symbolic tribute or provisioning the elite with a needed subsistence resource, is discussed.

Michlovic, Michael & Michael Hughey (Moorhead State)

[301] CONTROLLING THE PAST: THE KENSINGTON RUNESTONE AND THE USES OF SCIENCE.

One enduring and popular version of the past in the American Midwest centers on the Kensington Runestone. The debate surrounding this artifact illustrates the gap between the lay public and the scientific community, and it provides a vehicle for understanding two opposing world views. One of these is rooted in the context of academia and the ideology of scientism, the other in the emotional and ideological needs of broad segments of the lay public.

Middleton, William D (Wisconsin-Madison)

[501] EXTRACTION OF PHYTOLITHS FROM PREHISTORIC AND CONTEMPORARY CAMELID DENTAL CALCULUS.

Phytoliths can be extracted from dental calculus deposits on herbivore teeth and identified. These phytolith assemblages aid in the reconstruction of herbivore diet, and consequently in the reconstruction of livestock management patterns. Phytolith assemblages extracted from a collection of prehistoric camelid teeth from Pirincay, Ecuador, reveal that a series of vertically stratified microenvironments within the valley were exploited by early camelid herders. Comparison with phytolith assemblages from a collection of contemporary camelid teeth from a known environment suggest that this method gives an accurate indication of diet.

Milanich, Jerald T (Florida) [Discussant 106]

Milanich, Jerald T (Florida) [Introduction 601]

Miller, C Dan (US Geological Survey)

[105] VOLCANIC DEPOSITS AT CERÉN, EL SALVADOR: THEIR ORIGIN, STRATIGRAPHY, AND EFFECTS ON STRUCTURES.

Excavations at Cerén exposed a series of alternating airfall and pyroclastic-surge (ash hurricane) deposits more than 5-m thick. The deposits were produced by fluctuating phreatomagmatic eruptions (caused by interaction of hot magma and water) from one or more vents within 1.5 km of the site. Falls of hot tephra (ash and coarser material) blanketed the site and ignited organic materials, including roofing thatch. Hot lava bombs penetrated structures causing widespread damage and started fires.

Wet pyroclastic surges entered the village at high speeds and collapsed the roofs of structures and toppled walls of weaker structures.

Miller, Karen (US Forest Service)

[711] COLLECTORS VS FORAGERS: EVIDENCE FROM PLATFORM PREPARATION SCARS ON WYOMING WASTE DEBITAGE AND CACHED FLAKE TOOLS.

Lithic analysts attempt to understand adaptive human behavior through structured studies of stone tool attributes. Platform preparation scars on waste debitage and cached flake tools can provide information applicable to hunter-gatherer economic patterns. Procurement, use, and discard of lithic materials are integrated into the subsistence system. Analyses of discarded and cached flakes from three sites in the Wyoming Big Horn Mountains indicate use of special work groups, use of materials for specific tool forms, differential material treatment based on labor investment, and differential material use based on availability.

Miller, Naomi F (Pennsylvania)

[609] GORDION ARCHAEOBOTANICAL STUDIES: TRACING HUMAN INFLUENCE ON THE VEGETATION.

Oak, pine, and juniper are the dominant forest trees near Gordion, in central Anatolia. Charcoal analysis documents gradual changes in forest composition between Old Hittite and Medieval times; environmental degradation becomes recognizable during the Phrygian period. Seed analysis supports the interpretation that these changes were due mainly to the felling of trees and over-grazing.

Millon, René (Rochester)

[505] TEOTIHUACAN RESIDENTIAL ARCHITECTURE.

The study of Teotihuacan residential architecture can yield important insights into its urban society. It can also lead to interpretations that are notably off the mark. Recent excavations in apartment compounds and other residential structures in three of the city's quadrants provide an expanded perspective and a more comprehensive context for the analysis of this architecture, for how it was used, and for the symbolic significance it had. This helps in relating the city's basic social units to its economy, its hierarchical structure, and its ritual, and broadens our understanding of Teotihuacan society as a whole.

Mills, Barbara (Arizona)

[304] STANDARDIZATION AND SPECIALIZATION IN CERAMIC PRODUCTION: A COMPARISON OF HISTORIC AND PROTOHISTORIC ZUNI.

Demographic, economic, and social changes were important effects of European contact and colonization throughout the Southwest, but the consequences at Zuni are still not well known. Changing economic organization at Zuni is investigated through a comparison of ceramics produced during the late 19th and early 20th centuries with those produced during the 15th through 17th centuries. Data on standardization in raw material selection and preparation are compared to explore the nature of changes in the organization of ceramic production from the protohistoric period to the recent historic period, when the context of production is more well known.

Milner, George R (Penn State), David G Anderson (National Park Service) & Marvin T Smith

(South Alabama)

[102] THE DISTRIBUTION OF EASTERN WOODLANDS PEOPLES AT THE PREHISTORIC AND HISTORIC INTERFACE.

For most of the Eastern Woodlands, the 200 years following Columbus' landfall in the Americas remain shrouded in mystery. This gap is beginning to be filled by the labor of many regional specialists. Nevertheless, a more precise understanding of the processes that resulted in cultural upheaval, population displacement, and demographic disaster requires a broader geographical perspective than the traditional research universe. Several maps bracketing AD 1500 summarize the spatial distribution of people and highlight areas where data are limited or nonexistent. Information is derived largely from recent work that presents a clearer picture of volatile sociopolitical and continually shifting demographic landscapes.

Milner, George R (Penn State) [Discussant 204]

Milner, George R (see Schroeder, Sissel) [403]

Mintz, John & Jerry Hilliard (Arkansas Archaeological Survey)

[104] THE SOCIAL AND POLITICAL IMPLICATIONS OF SLAVERY IN THE OZARK PIONEER PERIOD.

The use of archival/historical data and limited archaeological testing have resulted in a more complete picture of slavery and its impact on the social, political, and economic stability of a small

mountain township in the Arkansas Ozarks. Census data and tax records are used to differentiate the location of slaveowners vs non-slaveowners. Status as evidenced by taxable goods is examined as a criteria of slaveholding. The results of this study suggest that political and economic factors did not necessarily dictate the ownership of slaves, but moral issues often played an integral part in determining the ownership of slaves.

Mitchell, Douglas (Soil Systems)

[210] BURIAL PATTERNS, AGGREGATION, AND POPULATION STRESS: A VIEW FROM THE DESERT SOUTHWEST.

A large mortuary assemblage from the Hohokam Classic period village of Pueblo Grande yielded 35 cases of multiple burials. Representing 5% of the burial population, these features occur throughout the village cemeteries and contain grave assemblages similar to the remainder of the population. It is argued that the presence of these features represents a response to increased aggregation and population stress during the late prehistoric era. A model is proposed for a high correlation between inheritance rules, land tenure practices, and changing burial practices as a result of overall stress. Ethnographic examples of multiple burials are presented in support of the model.

Mitchell, Douglas (see Peterson, Jane) [210]

Mitchem, Jeffrey M (Arkansas Archaeological Survey)

[310] LATE MISSISSIPPIAN/PROTOHISTORIC RESEARCH AT PARKIN ARCHAEOLOGICAL STATE PARK, ARKANSAS.

Excavations since 1990 at Parkin Archaeological State Park have been concentrated in four parts of the site. One is a series of superimposed structure floors outside the moat surrounding the 17-acre village. Radiocarbon dates of AD 1300-1375 for the uppermost floor provide a *terminus post quem* for moat construction. A trench across the moat reveals a wide, shallow ditch around the aboriginal town. The third area is an undisturbed section where a house was located until recently. Excavations here have revealed aboriginal features and burials. The fourth section is a former mound location, yielding house floors and burials.

Mobley-Tanaka, Jeannette L (Colorado Museum)

[210] BONE AWLS FROM YELLOW JACKET COLORADO: THEIR USE AND RELATIONSHIP TO PERISHABLE INDUSTRIES.

Use wear analysis of a large collection of bone awls from Yellow Jacket, Colorado [5MT3], indicates that the tools were used in several distinctly different ways, presumably in the manufacture of perishable items. Because perishable objects, such as baskets, are seldomly recovered from open sites, they are frequently overlooked as important industries. The analysis of the prehistoric assemblage is combined with use wear replication studies to better understand the use of bone awls, and some thoughts are offered on reconstructing perishable industries at sites where they are not preserved.

Mock, Shirley (Texas-Austin)

[706] ARCHAEOLOGICAL EVIDENCE OF DECAPITATION SACRIFICE IN MESOAMERICA: A PRELUDE TO REBIRTH.

This paper examines the multivalent role of sacrifice by decapitation in structuring the archaeological record of Mesoamerica. Attention is focused on the site of Colha in Belize, where 30 individuals were decapitated and flayed, with their skulls deposited near a stairway of an elite structure in a single termination event. Evidence from ethnohistorical and iconographic sources is presented to support the argument that this event, dated to around AD 850, was a revitalization attempt related to the metaphoric processes of death and rebirth central to the Popul Vuh, the sacred book of the Quiché Maya.

Moe, Jeanne (BLM) & Kelly A Letts (Windrose Consulting)

[106] INTRIGUE OF THE PAST: INVESTIGATING ARCHAEOLOGY, A SECONDARY EDUCATION PROJECT.

The secondary education project contains two major components: development of usable materials and delivery to teachers who will use them. Prime developmental considerations were the culture of secondary education and teachers' needs. The lessons target many Utah Core Curriculum objectives required in traditional subjects such as Utah studies, history, geography, and science. The guide contains recent research, hands-on activities for school settings, and application of the scientific method to archaeological problems. Archaeological concepts and problems are used as themes. In-service workshops are used. Workshops are instructed by teachers and archaeologists, thus forming a link between the two professions.

Moe, Jeanne (see Letts, Kelly A) [106]

Monaghan, John D (Vanderbilt)

[306] HIGHLAND-COASTAL INTERACTION IN THE MIXTECA.

This paper examines highland-coastal interaction during the Postclassic period in terms of the marketing system developed in the Mixteca to exchange products between kingdoms occupying complementary ecozones. It suggests that these markets were not situated in the ceremonial centers of these often competing polities, but along their boundaries, in neutral areas, where they were frequently associated with pilgrimages and other ritual events.

Montet-White, Anta & Jeff T Williams (Kansas)

[103] A REINDEER HUNTERS' WINTER CAMP DURING THE LAST GLACIAL MAXIMUM.

The site of Grubgraben, Lower Austria, was occupied repeatedly between 19,000 and 16,000 BP. The paper focuses on the topmost layer (AL1), which includes the remains of a series of occupations by small groups of Epigravettian reindeer hunters adapted to the severe environmental conditions of the last major glacial advance. Statistical analyses are used to investigate the formation and arrangement of features and spatial distribution of artifacts and faunal remains. An interpretation of the site's organization is proposed.

Moore, Andrew M T (Yale) & Gordon C Hillman (London)

[213] THE YOUNGER DRYAS AND THE TRANSITION FROM FORAGING TO FARMING IN SOUTHWEST ASIA.

We present new evidence suggesting that the Younger Dryas (c 11,000-10,000 BP) worldwide episode of cooling had a significant impact on climate, vegetation, and human economy in Southwest Asia. A new pollen core extracted from Lake Huleh and plant remains from the early village of Abu Hurayra I indicate that forest gave way to steppe contemporary with the Younger Dryas. This deterioration in climate and vegetation led to significant disruptions in culture and settlement over a wide area. We argue that the stresses induced by these events were a contributory factor in the subsequent development of agriculture in Southwest Asia.

Moore, Elizabeth P (Nevada-Reno)

[208] ANALYSIS OF VERTEBRATE REMAINS FROM WARNER VALLEY, OREGON.

In Warner Valley, Oregon, the University of Nevada at Reno (cooperating with the BLM) has excavated 15 sites on lakeshores, in dunes, and in upland locations over five field seasons. More than 18,000 bones of vertebrates have been recovered from sites dating from terminal Pleistocene to late Holocene. Analyses of the bones have identified at least 13 taxa. The sites show variability in seasonality and hunting strategies by the prehistoric occupants. The analyses also allow models to be constructed of changes in paleoenvironments and paleoecogeography.

Moore, Katherine M (Bentley)

[506] MEASURES OF MOBILITY AND OCCUPATIONAL INTENSITY IN A SEVERE BUT LESS-SEASONAL ENVIRONMENT IN PERU.

Preceramic (9000-3800 BP) and Formative (3800-1500 BP) occupations on the Junin Puna of Peru are local adaptations to severe daily climate changes but only minor seasonal variation. Attention has been directed toward whether this pattern led to a relatively non-seasonal or possibly sedentary prehistoric occupation. Fragmentation and alteration of animal bone was used to measure variation in occupational intensity at Panaulaca, a deeply stratified cave site. Two distinct patterns emerged—an early period of moderate occupational intensity followed by a period of heightened occupational intensity. Qualitative indicators of seasonality from bones in the same layers confirm this interpretation.

Moreau, Jean-François (Quebec-Chicoutimi)

[605] FROM IDEOTECHNICS TO SYMBOLS: ETHNIC IDENTITY AND ETHNICITY OF ALGONQUIAN AND IROQUOIAN GROUPS IN THE CENTRAL EASTERN SUBARCTIC.

The descriptive/normative concept of ethnic identity derived from sociocultural anthropology, applied to archaeological remains from the central Eastern Subarctic, tends to emphasize mobile hunter-gatherer Algonquian adaptive traits over sedentary food-producer Iroquoian patterns. An alternative concept of ethnicity as a social process clarifies cultural developments that led to the presence of both Algonquian and Iroquoian patterns in the central Eastern Subarctic. The propensity of archaeologists to adopt definitions of ethnic identity and ethnicity from sociocultural anthropology may produce inappropriate theoretical bases for understanding the northern Iroquoian and Algonquian communities that were likely linked by fluid social ties.

Morey, Darcy (Tennessee)

[312] ECONOMIC USE OF DOMESTIC DOGS IN THE ARCTIC: A ZOOARCHAEOLOGICAL VIEW FROM GREENLAND.

An analysis of archaeological skeletal remains of domestic dogs from Greenland was initiated to explore economic use of the animal among peoples in the eastern arctic. Dogs were present from

earliest Paleoeskimo times, and presence of cutting/skinning marks on bones attests to use of the animals for economic purposes beyond traction. Neoeskimo dog remains are abundant, and in some cases contextual and osteological evidence highlights use of dogs as an emergency food resource. Deliberately induced bone pathologies provide insights into management of the animals. Disciplinary techniques responsible for these pathologies can be inferred.

Morley, Selma (California State-Long Beach)

[410] INTRA-SITE SPATIAL DATA INTEGRATION: GEOGRAPHIC INFORMATION SYSTEMS ON MICRO-SCALE.

Archaeologists commonly employ database systems to retrieve and manipulate datasets generated by excavation. Geographic information systems (GIS) are particularly well suited to handle spatially referenced data. The ability of GIS to rapidly analyze databases, create new information, and display results in cartographic representations offers an unrealized potential in archaeology. This paper links archaeology and GIS to provide a visual analysis of research data collected from an Anasazi site in southwestern Utah. Specifically, pueblo architecture is integrated with artifact distributions, microtopography, and geophysical data enabling the systematic exploration of spatial relationships among themes. Analysis reveals correlations between attributes.

Morris, Elizabeth A (Arizona State Museum) [Discussant 205]

Morrison, Kathleen D (UC-Berkeley)

[511] CHARTING THE PATH OF CHANGE: INTENSIFICATION AND EXPANSION IN INDIAN AGRICULTURE.

Much ink has been spilled in discussions of the causes of productive intensification, but relatively little attention paid to the variable courses intensification may take. This paper outlines the path of agricultural intensification in the hinterland of a pre-Colonial South Indian city, Vijayanagara. In this area, diversification of production accompanies more recognizable forms of agricultural intensification. In part, this concurrent expansion and intensification stems from the institutional structure of irrigation and investment. Evidence for the source of agricultural change in the Vijayanagara region is discussed, incorporating pollen, archaeological, and epigraphic data.

Morrow, Toby (Wisconsin-Madison)

[412] REFITTING AND ARCHAEOLOGICAL INTERPRETATION: SOME OBSERVATIONS FROM THE TWIN DITCH SITE, GREENE COUNTY, ILLINOIS.

The refitting of stone tools and debris is a powerful technique for investigating intrasite spatial structure. However, all refits are not created equal. The types and origins of fractures resulting in refittable fragments strongly pattern both the frequency and spatial array of conjoinable pieces. This paper explores the contexts of refitted lithic artifacts recovered from Horizon 2 of the Twin Ditch site, a well preserved, buried Early Archaic habitation surface in the lower Illinois River Valley. Several tentative explanations are suggested for the patterns observed.

Morter, Jonathan (Texas-Austin)

[108] A "SOCIAL" STRUCTURE AND "SOCIAL STUCTURE": RECENT NEOLITHIC ARCHITECTURAL FINDS FROM CALABRIA.

Excavations at the Middle Neolithic site of Capo Alfieri have revealed several structural components. These include elements of what seems to be incipient monumental architecture. Similar structures of the same period also have come to light recently on Sicily. This paper examines the implications of the presence of these structures for understanding the societies involved, within the context of the trajectory of Neolithic settlement.

Moseley, Michael E (Florida) & James B Richardson III (Carnegie Museum of Natural History)

[109] FLOOD EVENTS, EL NIÑO EVENTS, AND TECTONIC EVENTS.

Along the hyper-arid coast of Peru, the coastal geoarchaeological record of Paleo-flood events exhibits episodes of exceptionally severe erosion and deposition that greatly exceed those produced by the 1925-26 and 1982-83 El Niños. Were the erosion and deposition strictly dependent on the amount of precipitation, then serious landscape modification should indicate extreme ENSO conditions or ancient "mega-niño" phenomena. However, when these very strong ENSO events are preceded by major tectonic activity, the synergistic consequences seem to lead to "radical environmental alteration cycles" (REACS), which exacerbate both erosion and deposition. Investigations have been conducted in the Ilo region and at the Santa River mouth in an effort to find correlations in the geoarchaeological record for the synergistic consequences of prehistoric and historic flood, El Niño, and tectonic events that might represent pan-Andean horizon markers along the entire arid coast.

Mrozowski, Stephen A (Massachusetts-Boston)

[709] LATE PREHISTORIC/EARLY HISTORIC NATIVE AMERICAN HORTICULTURAL PRACTICES ON CAPE COD.

This paper presents the preliminary results from a Late Prehistoric/Early Historic Native American site discovered on Cape Cod that contains the remains of a Native American field. The field is comprised of over 40 intact "cornhills" that appear to date to the late 16th/early 17th century. The site may represent a refuge site associated with the 1622 pacification program of Plymouth Plantation designed to insure hegemony over Cape Cod. The primary focus of the paper is the results of preliminary archaeobotanical and geochemical analysis of the "cornhills" and what it tells us about late prehistoric horticultural practices among the native groups of coastal New England.

Muller, Jon (Southern Illinois-Carbondale)

[403] MACRO-REGIONAL INTERACTION IN THE SOUTHEAST.

Southeastern polities interacted at different levels at different times. Communities rarely were integrated much beyond the local level. Even so, quantities of sumptuary and other goods were exchanged. Several more-or-less explicit models of these exchange systems have been proposed. Early models for macro-regional exchange often emphasized political and religious integration of large areas. Other models suggest elite-to-elite exchange as part of a "prestige economy." Relatively simple down-the-line exchange models (some even paralleling the Kula Ring) also have been proposed. Models of southeastern exchange are evaluated in terms of what we may learn about macro-regional integration in the Southeast.

Mullins, Paul R (Massachusetts-Amherst)

[606] COMPETING FORMS OF CAPITAL: THE ARCHAEOLOGY OF EXCHANGE

RELATIONSHIPS.

This paper examines the archaeology of competing forms of capitalism and the socioeconomic relationships promoted by those oppositional formations. Competing perceptions of "profit," "social status," and "exchange" are examined in the archaeology of agrarian production and consumption networks, urban craft trade, and mercantilism using archaeological examples from the colonial Chesapeake, Annapolis, Maryland, and the postbellum Shenandoah Valley.

Murowchick, Robert (Harvard)

[708] WRITTEN IN METAL: INTERPRETING THE RITUAL BRONZES OF SOUTHWESTERN CHINA.

The bronze industry of the Dian chiefdom in Yunnan Province was among the most sophisticated in ancient China. Among the vast quantities of bronze artifacts recovered from the tombs of the Dian elite, the skill of the Dian metallurgists is best shown in the highly detailed two- and three-dimensional scenes of ritual activity that adorn many of the bronzes. A careful reading of these scenes, when combined with ethnohistorical observations in a number of ancient texts from south and southwest China, provides an intimate look at the role of ritual in Dian society in the late first millennium BC.

Murphy, Tracy & Christopher James Imhof (Colorado-Boulder)

[210] PREHISTORIC MANUFACTURING PROCESSES: REPLICATION OF PENDANTS, SAWs, AND DRILLS, YELLOW JACKET, COLORADO.

An inordinate number of pendants and pendant fragments from Yellow Jacket, Colorado, raise the question of pendant manufacturing techniques in the prehistoric Southwest. A replication study was undertaken to address the question. Local materials are used to replicate pendants and the tools necessary for pendant manufacture. The process of manufacture and use wear on the tools is reported. The results of this experiment are compared to the prehistoric collection from 5MT3, Yellow Jacket, Colorado. Use wear on tools and patterns of pendant breakage are compared. Implications for craft specialization are considered.

Murray, Matthew L (Harvard)

[408] LATE BRONZE AGE LANDSCAPE TO IRON AGE URBANSCAPE: A STUDY OF SETTLEMENT DISCONTINUITIES AT KELHEIM AN DER DONAU, BAVARIA.

The large, defended sites of the European Late Iron Age (*oppida*) have generally been treated as singular phenomenon, uniform in function and enigmatic in origin. Little work has been attempted on the study of the hinterlands of these sites, and on the cultural landscapes in which they emerged. A current program of field and archival work characterizes changes in the cultural landscape surrounding the *oppidum* of Kelheim during the final millennium BC. The results of this study suggest that discontinuities in the structuring of the landscape require the rethinking of Late Iron Age *oppida* as uniform "urban" economic and social nodes.

Mutchka, John S (see Neusius, Sarah) [215]

Myers, J Emlen, M James Blackman & Jacqueline S Olin (Smithsonian)

[309] ARCHAEOLOGICAL IMPLICATIONS OF DEPOSITIONAL ALTERATION IN THE ELEMENTAL COMPOSITION OF CALCIAREOUS CERAMICS.

Leaching of soluble calcium compounds from ceramics buried at wet, acidic archaeological sites has a pronounced effect on concentrations of elements used in ceramic compositional studies. The effect is documented for majolica tablewares excavated at 16th century sites in southwestern Spain and the southeastern US and Caribbean. Concentrations of trace elements and iron are systematically enriched by as much as 20%, such that the compositions of "leached" and "unleached" artifacts from the same production source are significantly different. The problem is resolved by modified sampling techniques or, for existing data, by the use of elemental ratios rather than the concentrations.

Nagaoka, Lisa (Washington)

[307] SCREEN SIZE EFFECTS ON FISH REMAINS FROM MOTURAKAU ROCKSHELTER,AITUTAKI, SOUTHERN COOK ISLANDS.

The effects of screen size on faunal remains has been documented by numerous researchers in Europe and North America. However, similar research is lacking for Pacific Island faunal assemblages. The fish assemblages from a Cook Islands rockshelter were analyzed to determine the effects of screen size on the distribution and frequency of taxa. The analysis shows no significant difference in the rank ordering of fish taxa recovered from 1/4" versus 1/8" screens. The apparent similarity in recovery between the two screen sizes is probably caused by the large sample size, family level identifications, and limited reference collection.

Nansel, Blane (Wisconsin-Milwaukee)

[607] HOPEWELLIAN INTERACTION IN THE CENTRAL AND UPPER MISSISSIPPI RIVER VALLEY: A VIEW FROM GAST FARM.

Controlled surface collections and test excavations at the Gast Farm site (13LA12), southeastern Iowa, reveal a localized blade core technology based on Warsaw Tabular and Burlington cherts which may have been used in regional exchange. Cobden chert blades, Knife River flint, sheet mica, copper axes, platform pipes, and Hopewell ware indicate full participation in the Hopewell Interaction Sphere. In addition, Black Sand ceramics and sherds sharing Black Sand and Havana attributes may indicate a transitional occupation and have implications for the development of regional chronology between the Illinois River Valley, the Quad-state region, and the Prairie phase of Wisconsin.

Nass, John P Jr (California-Pennsylvania) & Flora Church (Archaeological Services Consultants)

[204] CENTRAL OHIO DURING THE LATE PREHISTORIC: SUBSISTENCE/SETTLEMENT SYSTEM RESPONSES TO RISK.

Subsistence/settlement system change in central Ohio during the Late Prehistoric (ca AD 900-1400) has been explained as a result of the influx of Middle Mississippian populations. Recent research indicates that Late Prehistoric populations in the region were the product of local developments. The role of climatic change and environmental risk as well as shifts in regional population densities and social risk as explanatory factors in these developments are explored in this paper.

Nass, John P Jr (see Frye, Lori A) [409]

Nassaney, Michael (Massachusetts-Amherst)

[310] THE ROLE OF CHIPPED LITHICS IN THE POLITICAL ECONOMY OF SOCIAL RANKING.

Chipped lithics can figure prominently in the transformation of social relationships. For instance, incipient elites may try to aggrandize themselves by controlling access to resources or the production process. I examine three aspects of stone tool technology—acquisition, labor allocation, and intensification—to explore how lithics were implicated in the integration and disintegration of the Plum Bayou culture in central Arkansas (ca AD 600-1000). The analyses expose longitudinal changes in the organization of technology which suggest rudimentary attempts at control and/or intensification. Despite these efforts, socially ranked individuals apparently failed to monopolize raw materials or production.

Neeley, Michael (Arizona State)

[311] TYPOLOGICAL AND TECHNOLOGICAL DISCORDANCE: AN ANALYSIS OF TWO LEVANTINE NEOLITHIC ASSEMBLAGES.

Archaeologists have typically expected typology and technology to covary. This assumption has been called into question with Marks' (1983) work in the Negev. Building upon the notion that typology and technology can exhibit variation independent of one another, two samples from Levantine Neolithic assemblages are examined. Both have been 'dated' typologically to the Pottery Neolithic (ca 8000-7000 BP) but exhibit notable technological variation. Focusing on the debitage and using a

number of exploratory techniques, explanations for the technological variability are offered suggesting that these assemblages represent different temporal phases within the Neolithic.

Neely, James A (Texas-Austin)

[210] MOGOLLON WATER-CONTROL AND IRRIGATION: A RECONSIDERATION BASED ON RECENT FINDINGS FROM WEST-CENTRAL NEW MEXICO.

The recent discovery of two water-control/irrigation systems with associated agricultural fields near Reserve, New Mexico, has augmented our knowledge as to the range of diversity and sophistication of Mogollon agricultural pursuits during the Reserve Phase (ca AD 1000-1150). The two systems are briefly described, and their functional characteristics are discussed. The relationship of these systems as parts of the regional settlement pattern/system is investigated, and the implied level of sociopolitical organization is examined relative to data obtained through regional site survey and the test excavations of associated habitation sites.

Neff, Hector (Missouri-Research Reactor)

[203] THE ROLE OF "SOURCING" IN EVOLUTIONARY ARCHAEOLOGY.

To understand how evolution created the material remains of past human activity, the archaeological record must be described in a way that permits recognition of diversification within historically continuous traditions of tool manufacture and use. From this perspective, compositional analysis of artifacts (or "sourcing") makes two crucial contributions to evolutionary archaeology: (1) it helps demonstrate historical continuity by tying artifacts to localized raw materials; and (2) it reveals how raw material procurement and preparation within particular traditions diversified over time. Recent studies of Guatemalan pottery, discussed briefly in this paper, exemplify the application of compositional analysis within an evolutionary framework.

Neiman, Fraser (Yale)

[203] STYLISTIC VARIATION IN EVOLUTIONARY PERSPECTIVE.

This paper describes some simple evolutionary models for understanding what archaeologists have traditionally called "stylistic" variation. It is argued that stylistic variation in behavioral phenotypes is the result of the intersection of 1) sampling error in the transmission of cultural information, and 2) learning rules, fixed by natural selection, that determine how energy is allocated in learning and performance. The models offer expectations for the dynamics of drift as monitored archaeologically and suggest answers to several outstanding questions in archaeological method.

Neitzel, Jill (Drew)

[403] EXPLAINING CHANGE IN THE SOUTHWEST: EVALUATING EVOLUTIONARY MODELS FROM THE MULTISCALAR PERSPECTIVE.

Southwestern archaeologists have made significant substantive and methodological contributions in monitoring culture change within sites, localities, and regions. However, their efforts to explain these changes have been less successful for a number of reasons. This paper considers how well we can presently explain the process of sociopolitical evolution in the Southwest. Key variables for constructing a general explanatory model are identified along with the empirical requirements for testing such a model. In addition, the value of taking a multiscalar perspective for explaining change is considered.

Nelson, Ben A (SUNY-Buffalo), Debra L Martin (Hampshire), Alan C Swedlund (Massachusetts-Amherst), Paul R Fish (Arizona State Museum) & George J Armelagos (Florida)

[210] STUDIES IN DISRUPTION: DEMOGRAPHY AND HEALTH IN THE PREHISTORIC AMERICAN SOUTHWEST.

Mortality curves and pathological profiles are developed for five strategic cases and used to evaluate several hypotheses about the conditions surrounding demographic disturbances and physiological disruption. The patterning appears best explained by an interaction between population density and political economy; little support is found for interpreting these phenomena as a function of aggregation, environmental marginality, or length of occupation. The apparent association between political structure and biological disruption is relevant to the ongoing debate about social inequality in the American Southwest.

Nelson, Margaret C (SUNY-Buffalo)

[404] EXPEDIENT AND OPPORTUNISTIC STRATEGIES OF TECHNOLOGICAL BEHAVIOR.

The concept of technological expediency has been broadly applied to interpretation of the role of all unretouched tool forms. In this paper, I re-examine the utility of this approach with two results. First, I criticize the application of concepts that describe technological strategies as classificatory labels for classes of tool form. Second, I propose a distinction between expedient and opportunistic

strategies of flake manufacture and use. These concepts are applied to analysis of land use patterns in a sub-region of the Mimbres-Mogollon, southwestern New Mexico.

Nelson, Reid (Washington State)

[205] THE CORE OF THE MATTER: BASKETMAKER II LITHIC TECHNOLOGY AND MOBILITY PATTERNS ON CEDAR MESA, SE UTAH.

Recent literature suggests that a shift to more sedentary settlement strategy is likely to be accompanied by shifts in the organization of lithic technology. These include a decline in standardized core reduction and formal tool production and an increase in unstandardized core reduction and expedient flake tool production. To determine whether this trend occurred on Cedar Mesa, southeastern Utah, technological characteristics of late Basketmaker II assemblages are compared with those of Basketmaker III and Pueblo II-III assemblages. Lithic technological indicators of Basketmaker II mobility patterns are evaluated in relation to other lines of evidence.

Netting, Robert M (Arizona) [Discussant 704]

Neusius, Sarah (Indiana-Pennsylvania) & John S Mutchka

[215] A LOW POWER ASSESSMENT OF METAL VERSUS CHERT CUTMARKS ON BONE.

Archaeozoologists have grown increasingly sophisticated in recognizing natural and cultural modifications to bone surfaces. One area of interest is in whether or not the raw material used to produce a cut can be identified on the basis of cutmark attributes. In this research study, cutmarks produced by iron, copper, and chert edges were evaluated using low power microscopy (20-140X). Our results suggest that it may be possible to differentiate between raw materials even without the use of more sensitive microscopy. This finding deserves further evaluation because of the potential for identifying the early introduction of metal implements into various cultural contexts.

Neverett, Margo (see Whelan, Mary K) [607]

Newby, Paige & Thompson Webb III (Brown)

[614] POLLEN AND SEDIMENT RECORDS FROM 500 BOYLSTON STREET: CORRELATIONS WITH ARCHAEOLOGICAL DATA.

The radiocarbon-dated pollen and stratigraphic record from a 5-m sediment column from 500 Boylston Street, Boston, MA, provides a regional and local record of vegetation changes from the mid-Holocene transgression to the historic back-filling of the Back Bay area about 100 years ago. Correlation of this stratigraphy with archaeological data collected from the site provides information that can be used to aid the interpretation of the timing, operation, and function of the Boylston Fishweir structure. These sources of evidence together provide insights into human adaptations to coastal settings during the late Archaic in New England.

Newsom, Lee (Florida)

[506] MACROBOTANICAL SEASONAL INDICATORS FROM SUBTROPICAL AND TROPICAL CLIMATES.

Timing of fruit production for macrobotanical remains and growth-ring analysis of wood samples have been applied at Florida Archaic period sites to examine season of occupation and the issue of sedentism. Plant measures were examined relative to complementary faunal measures to clarify site use. Subtropical Florida is subject less to annual fluctuations in temperature than to variations in moisture availability. Phenologies of native trees coincide, as in much of the seasonally dry tropics, with the rainfall regime. Sensitive plant measures of seasonal site use are available for sites in southern Florida and the Caribbean, as in temperate regions.

Nials, Fred L (see Durand, Stephen R) [514]

Nicholas, Linda M, Gary M Feinman (Wisconsin-Madison) & Steadman Upham (Oregon)

[107] NEW PERSPECTIVES ON THE SOUTHWEST AND HIGHLAND MESOAMERICA: A MACROREGIONAL APPROACH.

The formation of macroregional political and economic systems in the Southwest and highland Mesoamerica during the late periods of prehistory is explored. Aspects of world systems theory (WST) are applied to the case studies, and suggestions are made for broadening WST for use with precapitalist, non-Western political and economic systems.

Nicholas, Linda M (see Feinman, Gary M) [306]

Nichols, Deborah L (Dartmouth)

[505] IRRIGATION AND THE TEOTIHUACAN STATE.

The growth of Teotihuacan led to major changes in the agricultural landscape of its hinterland that included the development of irrigation. Economic models often assume maximization of production;

however, Jeffrey Parsons has recently argued that exerting direct control over agricultural production was often more important to the Teotihuacan state than productive efficiency. Archaeological excavations and survey data indicate a complex state strategy of manipulating irrigated land and water resources, in some cases, to intensify agricultural production, but, in other cases, valuable irrigable land was actually taken out of production to facilitate the nucleation of population at Teotihuacan.

Nickens, Paul & Roger Saucier (Corps of Engineers)

[707] ENGINEERING SOLUTIONS FOR HERITAGE PRESERVATION: THE ROLE OF THE CORPS IN ARCHAEOLOGICAL SITE PROTECTION AND PRESERVATION RESEARCH.

During the past 20 years North American archaeology has witnessed an increased recognition of the need for a conservation approach for the remaining vestiges of the archaeological record. Federal agencies likewise have achieved greater understanding of the need to effectively manage and preserve resources under their jurisdiction. Over the past seven years the Corps of Engineers has assumed a position of leadership among agencies producing research leading to meaningful *in situ* archaeological site protection and preservation. This paper discusses the factors that led to the initiation of this research effort, the objectives, the substantive results that have been produced, and directions for the future.

Nielsen, Axel E & Amy Tucker (Arizona)

[309] MICROARTIFACT ANALYSIS: A CASE STUDY FROM HOMOL' OVI II.

The reconstruction of activity areas and room function is a necessary condition for undertaking studies of prehistoric social organization at the household and community levels. The lack of primary refuse in southwestern pueblos often represents a major obstacle for this kind of research. Over the last decade, microarchaeological analysis has gained increasing popularity as a method for reconstructing past activities in areas where various formation processes have resulted in the removal of floor assemblages. This paper evaluates the potential of microartifact analysis for activity area reconstruction using data from two rooms and one extramural area at the Pueblo IV site of Homol' ovi II.

Nielsen, Axel E, James M Skibo & William H Walker (Arizona)

[703] THIS IS NOT ANOTHER PAPER ON FORMATION PROCESSES.

Behavioral Archaeology was introduced in the mid-1970s as both a methodological and theoretical program that emphasized behavior as a central unit of analysis. Most accomplishments of the program, however, have been confined to the realm of behavioral reconstruction. Post-processual Archaeology, on the other hand, has raised a number of relevant theoretical issues without offering an acceptable methodology to address them. This paper emphasizes the need to develop adequate methodologies for current theoretical questions. This point is illustrated by the consideration of relevant behaviors that need to be reliably measured to study religion, gender and technology, and political economy in prehistory.

O'Brien, Helen L (see Stephen, David V M) [410]

O'Brien, Michael J (Missouri-Columbia)

[703] THE FIT BETWEEN BEHAVIORAL ARCHAEOLOGY AND A DARWINIAN-BASED EVOLUTIONARY ARCHAEOLOGY.

In the early 1970s Reid, Schiffer, and Rathje espoused an archaeology design to examine various relations between human behavior and material culture, regardless of time or place. One strategy of this archaeology was a search for laws useful in describing and explaining human behavior. At first glance behavioral archaeology appears to have little in common with a Darwinian-based evolutionary archaeology, given that under the latter approach the only important law is that of contingency. But in fact, the fit is closer than it appears, since both perspectives focus on material items and the behaviors that create those items.

O'Brien, Michael J (see Holland, Thomas) [203]

O'Brien, Patricia J (Kansas State)

[107] THE ROUTES AND SUBSYSTEMS OF CAHOKIA'S WORLD-SYSTEM.

Cahokia was the center of a vast exchange network at AD 1100. The obvious routes of the system were the Mississippi and Missouri rivers and major tributaries, but land trails also existed, connecting Cahokia to its peripheral sub-systems like Aztalan in Wisconsin, the Apple River sites in northern Illinois, Mill Creek in northwestern Iowa, and Steed-Kisker west in Kansas City. A major east-west trail moved across Illinois and Missouri, joining the Pawnee Trail in Kansas. The Pawnee Trail was ultimately linked to the Southwest. This paper reconstructs that trail system and documents the movement of specific goods along it.

O'Shea, John M (Michigan)

[603] THE CHARACTERIZATION OF SOCIAL COMPLEXITY AND ITS ARCHAEOLOGICAL RECOGNITION.

Implicit in any discussion of 'emergent' complexity is the assumption that complex societal organization can be detected and correctly identified in the archaeological record. Yet, many of the attributes that archaeologists frequently associate with complex organization, such as hereditary and ascriptive social positions or the unequal distribution of exotic goods, are common among tribal societies that would not normally be termed complex. This paper considers the archaeological evaluation of social complexity in a series of ethnographic and archaeological cases, with particular emphasis on the domains of mortuary treatment and spatial organization.

Odell, George H (Tulsa)

[509] TESTING MOBILITY ORGANIZATION: DID BINFORD HAVE IT RIGHT?

Lithic data from ten components of five sites in the Illinois Valley dating from 6500 BC to AD 1000 were analyzed to test propositions of changing hunter-gatherer mobility strategies through prehistory. Since intensive use-wear analyses had been conducted, functional information could be added to the suite of commonly analyzed technological and typological variables, making this perhaps the most intensively studied American lithic data set to have addressed these questions. Most of the results support the changes in mobility organization in the direction proposed by Binford and other theorists.

Olin, Jacqueline S (see Myers, J Emlen) [309]

Olsen, Sandra (Carnegie Museum of Natural History)

[211] CHAOS IN PREHISTORY: THE COMPLEXITIES OF RECONSTRUCTING PALEOLITHIC HUNTING AND FORAGING STRATEGIES.

The reconstruction of Paleolithic hunting/foraging strategies is daunting since it depends on a vast array of both identifiable and indeterminate variables. The less discernable factors affecting subsistence behavior include daily temperature and precipitation, prey population fluctuations, the individual's acumen, and the level of perishable technology, among others. Chaos theory, the concept that simple processes in nature can produce unexpectedly complex results and that order emerges in this complexity, has taken hold in such diverse disciplines as astronomy, ecology, and economics. Application of chaos to Paleolithic subsistence patterns demonstrates the important role it can play in interpreting the archaeological record.

Orr, Heather (see Masson, Marilyn A) [706]

Orser, Charles E (Illinois State) [Discussant 104]

Osborn, Alan J & Ralph J Hartley (National Park Service)

[702] THEORY AND METHOD IN PUBLIC PROJECT ARCHAEOLOGY: ISLAND-IN-THE-SKY PROJECT, CANYONLANDS NATIONAL PARK, UTAH.

Public resource management projects can be well suited for conducting relevant, productive archaeological research. National parks, monuments, and recreation areas provide invaluable opportunities for investigating a range of archaeological problems and for contributing to cultural resource conservation and interpretation. Archaeological resources in many western parks consist primarily of "low visibility" remains, e.g., isolated artifacts and artifact scatters. One component of the research program for the Islands-in-the-Sky project in Canyonlands National Park, Utah, focused on data recovery, analysis, and interpretation of numerous artifact scatters. This paper discusses the dynamic interrelationships between archaeological resource management and current developments in archaeological theory and methodology.

Osborn, Alan J (see Brenton, Barrett) [210]

Osborne, Philip (see Rolingson, Martha A) [406]

Otte, Marcel (see Straus, Lawrence) [211]

Otto, Martha & Bradley T Lepper (Ohio Historical Society)

[406] THE OHIO HISTORICAL SOCIETY: 107 YEARS OF PRESERVING AND INTERPRETING ARCHAEOLOGICAL SITES.

Founded in 1885 as the Ohio State Archaeological and Historical Society, OHS grew rapidly into one of the premier institutions for the preservation and interpretation of archaeological sites in eastern North America. The archaeological parks and museums operated by OHS include four sites preserved without active interpretation; six sites with museums and/or other interpretive programs; and three sites that serve as regional centers for public education. These efforts to preserve and interpret for a

wide audience Ohio's rich prehistoric and early historic legacy are a promising beginning, but greater exertions will be necessary to insure the future of Ohio's past.

Owen, Bruce (UCLA)

[405] COASTAL COLONIES AND THE COLLAPSE OF TIWANAKU: THE COASTAL OSMORE VALLEY, PERU.

Significant Tiwanaku settlement in the Osmore drainage on the western slopes of the Andes extended to the middle elevation Moquegua area, but did not reach the coast until the Tiwanaku state disintegrated. New radiocarbon dates and detailed analysis of midden, domestic architecture, ceramics, and tomb contents suggest that small groups of settlers from the Moquegua area brought new subsistence and craft technology in variants of the Tiwanaku tradition to the coastal Osmore Valley, and were closely linked to the development of the lower and middle elevation Chiribaya chiefdoms of the early Late Intermediate period.

Pacheco, Paul J (Ohio State)

[302] OHIO MIDDLE WOODLAND INTRACOMMUNITY SETTLEMENT VARIABILITY: A CASE STUDY FROM THE LICKING VALLEY.

Prufer's hamlet model has theoretical implications for interpreting Ohio Middle Woodland settlement variability. In this paper, working hypotheses derived from the Prufer model are applied to the results of a siteless survey conducted on 21 ha of glacial outwash terrace located 2.5 km west of the Newark Earthworks. A cluster of Middle Woodland hamlets was identified based upon these hypotheses. Other Middle Woodland locations also were identified occupying inter-hamlet space. Middle Woodland intracommunity settlement variability is explored by examining such topics as surface assemblage composition, cluster size and structure, dispersion, and contemporaneity.

Pacheco, Paul J (see Dancey, William S) [302]

Paine, Richard R (Penn State) & AnnCorinne Freter (Ohio)

[209] LATE CLASSIC ENVIRONMENTAL DEGRADATION IN THE COPAN VALLEY: IMPACT ON HOUSEHOLD SURVIVAL.

This paper explores the effects of overpopulation and declining land productivity on Late Classic household survival, using hazards techniques and a sample of ninety dated household groups from the Copan Valley. Group survival is represented by obsidian hydration date spans, with changing ecological setting included as an explanatory variable. Analyses show proximity to non-degraded agricultural land is a primary factor in household survival ($p < .01$), supporting Sanders' ecological model of the Classic Copan collapse.

Palmer, Carol (Sheffield)

[213] ETHNOBOTANICAL INVESTIGATIONS OF TRADITIONAL DRY-FARMING IN NORTH-WEST JORDAN.

The long-term aim of this project is to establish botanical criteria for identifying past crop husbandry practices on the basis of arable weeds found in archaeological charred grain assemblages. An integral part of this study is the examination of factors which affect the farming strategies of small-scale contemporary cultivators working in a semi-arid Mediterranean environment. Arable weeds have been systematically sampled from plots with known management backgrounds, namely different crop rotation and fallow systems. Statistical analysis of the data is currently in progress. Ultimately, comparison of modern weed ecology with the weeds accompanying ancient crop samples should facilitate the identification of past crop husbandry practices.

Pappalardo, A Michael (SUNY-Binghamton)

[214] APPLICATION OF GROUND-PENETRATING RADAR TECHNOLOGY TO URBAN ARCHAEOLOGY.

Recent advances in ground-penetrating radar technology facilitate the more efficient detection of sub-surface archaeological features. Field testing has been conducted to ascertain how well this technology can locate historic features such as house foundations, privies, and wells. The Binghamton Mall site provides a controlled environment in which to test this device in an urban context against data derived through extensive excavations and historic maps.

Parry, William J (Hunter)

[404] ARCHAEOLOGICAL CORRELATES OF PRISMATIC BLADE TECHNOLOGIES IN NORTH AMERICA.

In a previous paper (Parry and Kelly 1987) it was argued that formalized lithic industries, based on bifacial technology, correlate with relatively mobile adaptations in North America, while sedentary populations typically used nonstandardized flake tools. However, this generalization is not true for

formalized industries based on prismatic blade technology. Seven different blade technologies, each temporally and spatially restricted and independent, are documented in North and Central America. I examine some archaeological correlates of blade industries, including mobility and settlement pattern, economy, social organization, and craft specialization, to suggest possible organizational bases for blade technologies.

Pasztor, Esther (Columbia)

[505] BODY PARTS: SOCIAL AND RELIGIOUS IDEOLOGY AT TEOTIHUACAN.

This paper analyzes the social and religious implications of the isolated representations of body parts in Teotihuacan art. Hearts, eyes, mouths, hands, claws, and footprints represent humans and supernaturals associated with other signs. The artistic structure of such fragmentation and dismemberment is interpreted as a reflection of Teotihuacan social practice and as the active agent in the creation of Teotihuacan civic identity.

Pavlish, Laurence A (Toronto), Patrick J Julig (Laurentian) & Ronald G V Hancock (Toronto)

[309] DISTINGUISHING EUROPEAN TRADE COPPER AND NORTHEASTERN NORTH AMERICAN NATIVE COPPER.

Instrumental neutron activation analysis (INAA), accelerator mass spectrometry (AMS) [Carbon-14 and REE], and lead isotope analysis are employed to examine the problem of chemically distinguishing between 16th and 17th century European copper and northeastern North American native copper samples which were recovered from archaeological contexts. Samples from geological and archaeological contexts are analyzed. Three chemically distinct groups of native copper are established. The geologically and archaeologically provenienced native copper samples are shown to separate from European copper with concentration differences of up to three orders of magnitude in the elements Au, Sb, and As.

Pavlish, Laurence A (see Hancock, Ronald G V) [309]

Pearce, Robert J (Western Ontario)

[406] RECONSTRUCTION AND PUBLIC EDUCATION AT THE LAWSON PREHISTORIC NEUTRAL IROQUOIAN VILLAGE SITE, LONDON, ONTARIO.

The Lawson site is a partially undisturbed Iroquoian village [5 acres in size] occupied by the prehistoric Neutral circa 1500 AD, in London, Ontario, Canada. Since 1978, the Museum of Archaeology (an affiliate of the University of Western Ontario) has carried out excavation, reconstruction, and a variety of public educational and interpretive programs here. The creation and maintenance of reconstructed longhouses and palisades are discussed, as are the success and failure of various educational programs for school children and other groups.

Pearsall, Deborah M (Missouri-Columbia), Elizabeth H Dinan (Illinois) & Marcelle Umlauf (Northern Arizona)

[501] IDENTIFYING RICE (*ORYZA SATIVA*), *POACEAE*, THROUGH PHYTOLITH ANALYSIS.

Multiple specimens of domesticated rice (*Oryza sativa*) and rice relatives in the *Oryzeae* tribe and *Bambusoideae* subfamily were analyzed to find characteristic and potentially diagnostic phytoliths. Several phytolith forms were documented which appear to be produced only in the genus *Oryza*; one form observed in the inflorescence may be diagnostic to the domesticated species, while the others may be limited to the tribe. The potential and limitations of identifying rice using phytolith analysis are discussed, both in reference to our on-going research and in reference to identification using bulliform cells, a method commonly used in Japan.

Pearsall, Deborah M (see Veintimilla, Cesar) [501]

Pease, David W (see Whalen, Norman) [613]

Pedrick, Kathy (Bureau of Reclamation) & Richard S Ciolek-Torrello (Statistical Research)

[701] SLICING THE PIE: THE ROOSEVELT RESEARCH PROGRAM.

This introductory paper discusses the history of archaeological research in the Tonto Basin. We trace the initial discovery of significant archaeological remains, the identification of the Salado as a distinctive cultural complex of pan-southwestern importance and the Tonto Basin as its heartland, and the development of theories to account for the Salado phenomenon. Reclamation's modification of Roosevelt Dam has made possible the first program of intensive scientific investigation of the Salado "heartland." The remainder of the paper describes how this program involves a number of archaeological teams and innovative approaches to studying the major issues of Salado prehistory.

Peña, Raquel (see Lewenstein, Suzanne) [510]

Pendergast, David M (Royal Ontario Museum)

[706] INTERCESSIONS WITH THE GODS: CACHES AND THEIR SIGNIFICANCE AT ALTUN HA AND LAMANAI, BELIZE.

Extensive stratigraphic excavation of elite and middle-class residences as well as communal structures at Altun Ha and Lamanai produced a large body of information on the composition and depositional patterning of caches. Both of these aspects of the dedicatory material suggest the general and specific intentions behind the activity, as do ethnohistoric and historic-period parallels within and beyond the Maya area. The data from the two sites serve as a basis for exploration of the significance of dedicatory activity in the context of lowland Maya political and religious life.

Pendergast, David M (Royal Ontario Museum) [Workshop]

[201] GRANTS FOR FOREIGN STUDENTS.

Peregrine, Peter (Juniata)

[206] THE MISSISSIPPIAN WORLD-SYSTEM.

Mississippian chiefdoms are characterized by social stratification, a reliance on maize horticulture, population concentration at large riverine centers, and extensive inter-regional trade in exotic goods. I argue that these can all be seen as products of an indigenous world-system, based on inter-regional trade in prestigious ornaments. I describe this world-system and relate Mississippian evolution to the processes of competition and differentiation fostered by it.

Person, Donald A Jr & Randolph J Widmer (Houston)

[602] SOIL CHEMISTRY AND ARCHAEOLOGICAL PRESERVATION AT COPAN.

The traditional archaeological view is that preservation of organic remains in tropical environments is poor. However, these generalizations about such conditions need to be tested. A spatial analysis of the pH values from the Classic period, Patio H, 9N-8, in the Sepulturas area of Copan, shows the values are culturally modified through the use of lime plaster and that these values are differentially distributed near buildings. The carbonates in the plaster buffer the acidity and create an environment favoring the preservation of faunal bone and skeletal material. These conditions are not uniformly distributed in residences throughout the Copan Valley.

Petersen, James B (Maine-Farmington)

[605] "IROQUOIAN" CERAMICS IN NEW ENGLAND: A RECONSIDERATION OF ETHNICITY, EVOLUTION, AND INTERACTION.

Ceramic attributes have long been considered diagnostic of Iroquoian populations in northeastern North America during the late prehistoric period. However, recently studied collections from New England and adjacent areas suggest that many of the Iroquoian diagnostic ceramic attributes were more widely employed by non-Iroquoian populations. Differentiation of diagnostic and nondiagnostic attributes for Iroquoian populations and the variable scales at which they operated is therefore critical. Likewise, the validity of defining prehistoric ethnicity and other social issues, such as cultural evolution and interaction, on the basis of ceramic material culture in northeastern North America warrants further consideration.

Petersen, James B (see Watters, David R) [503]

Petersen, James B (see Baker, Thomas R) [614]

Petersen, James B (see Richardson, James B III) [709]

Peterson, Jane, Douglas R Mitchell (Soil Systems) & M Steven Shackley (UC-Berkeley)

[210] MODELLING PATTERNS OF LITHIC PROCUREMENT AND PRODUCTION: REGIONAL AND INTRASITE APPLICATIONS OF OBSIDIAN X-RAY FLOURESCENCE DATA FROM PUEBLO GRANDE, ARIZONA.

A large set of X-ray fluorescence data from a Hohokam site in the Salt River Valley offers a unique opportunity to chart the organization of obsidian networks. At an intrasite scale, many discrete habitation and burial contexts are associated with a limited subset of obsidian types. These associations are used in conjunction with other site information to map the spatial analogs for some level of group affiliation. A regional perspective, incorporating past sourcing projects, allows tracking of the variability in procurement strategies across time and space. Current models of trade/procurement networks are reevaluated in light of the Pueblo Grande assemblage.

Petraglia, Michael D (Smithsonian)

[103] INTRASITE SPATIAL PATTERNS AND SITE FORMATION PROCESSES AT THE ABRI DUFAURE.

The Paleolithic record consists of a complex interplay between topographic conditions, human activity, depositional processes, and post-depositional agents. Cultural and non-cultural material

residues are arranged in a three dimensional matrix described in terms of its composition and spatial attributes. From this record, we attempt to understand the link between past behavior and intrasite patterns. Expectations under which rockshelter and slope sites form are modelled, and inferences concerning the cultural and non-cultural processes responsible for site formation are advanced.

Pike-Tay, Anne (Vassar)

[309] DEVELOPING A CONTROL SAMPLE FOR ARCHAEOLOGY OF DENTAL ANNULI AND CROWN HEIGHTS IN *RANGIFER TARANDUS*.

Dental annuli analysis and crown height measurements are two potentially powerful techniques for investigating prehistoric settlement and subsistence systems. However, modern control samples are pre-requisite for any study concerned with the seasonality and demography of archaeofaunas. Initial findings from research recording both annuli and metric data from the teeth of nearly 1000 thoroughly documented reindeer/caribou individuals are presented. This unique database allows for rigorous testing of the limits of, and assumptions behind, methods and techniques of seasonality and age determination that are being increasingly employed by zooarchaeologists.

Pintar, Elizabeth (Southern Methodist)

[610] TOOL-KITS AND RAW MATERIAL USE: ARCHAIC HUNTERS OF THE PUNA.

Quebrada Seca 3 rockshelter in the Argentine Puna has a nearly continuous record of camelid hunter occupations spanning the Early to Late Archaic (8600-4500 BP). Yet over that period, there were changes, some slight, other major, in the environment. The degree to which these changes affected the hunting strategies are evident in changes in site function, permanence, and mobility as tracked by variability in stone-tool class diversity, breakage patterns, retooling of projectile points, and raw material use.

Piperno, Dolores R (Smithsonian)

[501] PHYTOLITHS IN THE REPRODUCTIVE STRUCTURES OF TEOSINTE AND MAIZE: IMPLICATIONS FOR STUDY OF MAIZE EVOLUTION.

Analysis of phytoliths from the reproductive structures of teosinte and maize shows that teosinte produces silicified bodies that may identify its presence in archaeological soils. Maize cobs are also highly silicified, yielding some unique phytoliths that, however, are not present in all races examined. Comparison of silicification loci and phytolith morphology in teosinte fruitcases, maize cobs, and tassels may provide a means by which to evaluate the major, competing hypotheses of maize evolution.

Pippin, Lonnie C & Colleen Beck (Desert Research Institute)

[702] THE PAHUTE/RAINIER MESAS LONG RANGE STUDY PLAN: A MODEL APPROACH FOR MITIGATING ADVERSE EFFECTS FROM LARGE CONSTRUCTION PROJECTS.

Pahute and Rainier mesas on the Department of Energy (DOE) Nevada Test Site are used for nuclear weapons testing amidst dense archaeological resources. DOE has initiated a long-range (10 year) plan for the mitigation of these effects through a comprehensive data recovery program directed toward a geographically representative 11% sample of all archaeological resources on Pahute and Rainier mesas. This approach avoids certain important constraints common to many resource management programs since it is based on the scientific sampling of geographic space rather than case by case mitigation in zones of direct disturbance.

Pohl, John M D (see Byland, Bruce E) [306]

Pohl, Mary (Florida State) & Kevin Pope (GEO ECO ARC Research)

[407] PREHISTORIC ENVIRONMENTAL CHANGE AND MAYA AGRICULTURE IN NORTHERN BELIZE.

Mayanists have debated whether environmental change occurred and the relative importance of wetland and upland or swidden agriculture. We describe data from cores and excavations in the floodplains and depressions of northern Belize and assess evidence for change. The data reveal a similar stratigraphy throughout the area and suggest that wetlands were a prime agricultural resource in the Maya Preclassic period. Natural and human-induced changes in the Late Classic period necessitated a change in subsistence strategies and a different balance of cultivation techniques. The implications for cultural developments are discussed.

Pohl, Mary (see Bloom, Paul R) [407]

Poirier, David A (see Bellantonio, Nicholas F) [705]

Polglase, Christopher (Goodwin & Associates)

[108] THE TRANSFORMATION OF OBSIDIAN PRODUCTION AND EXCHANGE IN SOUTHERN ITALY DURING THE NEOLITHIC.

The period from the Early to the Late Neolithic (ca 5000-3000 BC) in southern Italy is marked by a dramatic transformation in lithic technology. This transformation is seen most clearly in the

production and use of obsidian, which is the focus of both the local lithic extractive industry, as well as a long-range exchange network. This paper focuses on the evidence for this transformation in the lithics industry, and it presents a series of interpretive frameworks for understanding concurrent social change.

Pope, Cynthia L (Texas-Austin) & John G Jones (Texas A & M)

[501] PALEOENVIRONMENTAL IMPLICATIONS FROM AN ARCHAIC SITE IN SOUTHWESTERN CHIAPAS: THE PHYTOLITH EVIDENCE.

Archaic sites from southern Chiapas are uncommon and usually occur in a coastal setting. A well stratified site was encountered in a survey of the cutbanks along a small stream, about 10 km inland from the coast. Abundant and well preserved phytoliths document that the environment of the site area during Archaic times was heavily covered with lowland tropical forest elements. Later Classic and Postclassic components of the site, however, document that the area had suffered from widespread deforestation. The phytolith assemblages from these upper site components were dominated by grasses and palms, representing an environment not unlike the cleared areas of this region today.

Pope, Kevin (see Pohl, Mary) [407]

Popper, Virginia (Michigan)

[411] THE EXPANSION AND INTENSIFICATION OF CHINAMPA AGRICULTURE IN THE BASIN OF MEXICO.

The great productivity of *chinampa* agriculture in the Basin of Mexico was a vital food source to the Aztec urban center, Tenochtitlan. This paper examines archaeological evidence from an Early Aztec community to suggest the nature of *chinampa* agriculture before its Late Aztec expansion. Excellently preserved plant remains evidence the richness and complexity of plant use and agriculture in the Basin. This paper then addresses how the *chinampa* system altered, given changes in population, and social, political, and economic conditions from the Early to Late Aztec periods.

Potter, Daniel (Harvard/Texas-San Antonio)

[706] STRAT 55 AND THE EVOLUTION OF LOWLAND MAYA BLOOD-RITUAL.

This paper describes the archaeological context of a Late Preclassic blood-letting cache excavated at the site of Colha, northern Belize. A reconstruction of ritual events which produced the cache is offered. Comparison of this cache to other lowland blood-ritual data has furnished a systemic model, in which blood-ritual is viewed as adaptable and evolutionary, rather than as a monolithic institution.

Potter, Stephen R (National Park Service) & Gregory A Waselkov (South Alabama)

[606] SEVENTEENTH-CENTURY ANGLO AND ALGONQUIAN SETTLEMENT PATTERNS ON THE CHESAPEAKE FRONTIER.

A widely accepted historical tenet holds that the early European invaders of eastern North America frequently settled on or near areas of earlier or extant Indian habitation. Yet few studies present substantive archaeological or documentary evidence to support this contention. Toward that end, we examine the settlement pattern and land use practices of the first English colonists to settle Virginia's Northern Neck and compare them with those of local Algonquians. English adaptation to their new environment, which had been occupied for centuries by the Algonquians, led to a convergence in the settlement patterns of the two societies.

Powell, Shirley (Northern Arizona)

[203] VARIATION IN EVOLUTIONARY ARCHAEOLOGY.

Evolution has been a common theme in archaeological research since the beginnings of a disciplinary archaeology in the late 1800s. Archaeologists look at things over comparatively long time spans, and these things change; this change is then characterized as "evolutionary." A major focus of archaeological research has been to identify the mechanisms that cause the observed change. Prime mover models, systems theory, and processual archaeology are all such attempts. However, in doing so, techniques often focus on central tendencies (and how they vary over time), rather than synchronic variation within a population (and how the structure of that variation changes over time). This focus hinders our understanding of how things change. In this paper recent evolutionary studies are examined to illustrate this point, and alternative approaches are suggested.

Pozorski, Shelia & Thomas Pozorski (Texas-Pan American)

[111] A BALLCOURT IN PERU? MID-SIZED ARCHITECTURE AT THE INITIAL PERIOD SITE OF PAMPA DE LAS LLAMAS-MOXEKE.

Recent excavations at Pampa de las Llamas-Moxeke uncovered an I-shaped court with sloping sides that shows superficial architectural similarities to ballcourt forms in Mesoamerica. Its location 2000 km too far south and a date that is 1500 years too early makes this structure an architectural enigma.

An additional atypical mound complex investigated was clearly oriented toward an intervalley road while simultaneously feigning adherence to prevailing tenets for nonresidential architecture. Both these exceptions contrast with the 85+ "normal" aligned mounds that face the central site axis and which are interpreted as administrative structures serving to monitor commodity storage and distribution.

Pozorski, Thomas (see Pozorski, Shelia) [111]

Pratt, G Michael (Heidelberg) & David S Brose (Cleveland Museum of Natural History)

[204] ALONG THE LAKE ERIE SHORES: THE LATE PREHISTORIC OF NORTHERN OHIO.

A reconstruction of climatic conditions and possible agricultural limitations during the late prehistoric period forms the background for consideration of two archaeological cultures of northern Ohio. Associated with two broad geographic and environmental areas (Lake Plains and Allegheny Plateau) along Lake Erie's southern shore, each culture exhibits traditional settlement/subsistence and ceramic design patterns until AD 1200-1400 when they converge toward a similar pattern of larger and more dispersed settlements and exhibit common ceramic design elements.

Preucel, Robert W (Harvard)

[506] ANASAZI MIGRATION AND CIRCULATION: A MOBILITY APPROACH TO SEDENTISM.

Most archaeologists regard the sedentarization process as necessarily entailing a reduction in total population mobility. In this paper, I develop an alternative model linking sedentism to specific mobility strategies. I argue that rather than reducing population mobility, sedentism involves the replacement of permanent moves with temporary ones in a process known in anthropology as the "mobility transition." Finally, I evaluate the utility of this model using an archaeological example from the prehistoric Southwest.

Preucel, Robert W (see Hill, James N) [603]

Prezioso, Susan C (SUNY-Binghamton)

[605] IROQUOIS COMMUNITY PATTERNS: EVIDENCE OF LONG-TERM ETHNIC IDENTITY AT THE FRINGE OF IROQUOIA.

For historical reasons, archaeologists trace Iroquois development within the tribal areas held at European contact. Because of the emphasis on recent prehistoric antecedents and the lack of earlier sites within this region, most chronologies begin with the Castle Creek phase. But settled agricultural life in palisaded villages with longhouses—aspects of Iroquoian culture that are closely bound to ethnic identity—occurred by AD 1000 in "fringe" areas such as the Susquehanna drainage. I suggest that: Iroquoia originally developed to the south and west, ethnicity must be defined contextually, and community patterns are an equal indicator of ethnicity as language or ceramics.

Price, H Marcus (Missouri-Columbia)

[202] LEGISLATING RESPECT FOR THE DEAD: WHERE WE ARE, HOW WE GOT HERE, WHERE WE ARE HEADED.

Modal values of society are reflected in laws, both of which are subject to change through time. The issue of respectful treatment of aboriginal remains and cultural materials in the United States is one such case. Beginning with the Antiquities Act of 1906 through the Native American Grave Protection Act of 1990, federal statutes have gradually evolved from a primary focus on acquisition and curation to a more formal recognition of aboriginal rights. State laws also are following in this general direction. Enlightened administration of the laws and good-faith communication between aboriginal and scientific communities will effect an appropriate balance between competing values.

Price, T Douglas, James Burton & Joseph Ezzo (Wisconsin-Madison)

[210] RESIDENTIAL MOBILITY IN THE PREHISTORIC SOUTHWEST: AN ARCHAEOOMETRIC APPROACH.

Residential mobility at Grasshopper Pueblo, an 800 year old community, is examined using strontium isotope ratios in bone and teeth as a signature of the geology of the area where individuals from these sites grew up and where they died. Comparison of values in bone with local bedrock and faunal remains documents the strontium isotope signatures for the region. Non-local strontium isotope ratios in teeth indicate emigrants to the site. There are measurable and meaningful differences between bones and teeth from the same individuals, among individuals from the same site, and between communities in the study area. This method provides an opportunity to assess directly the movement of prehistoric peoples in the Southwest.

Pyburn, K Anne (Indiana)

[414] THE ARCHAEOLOGIST AND THE SACRED TEXT: POLITICAL CONSCIOUSNESS AND THE DIRECT HISTORIC APPROACH.

No sane archaeologist would argue against the importance of ethnographic analogy in the reconstruction of extinct lifeways. However, a curious theoretical divergence is appearing between theory and practice in the discipline. Those archaeologists most concerned with the political implications of archaeological endeavor are also those most likely to give first weight to the direct historic approach in ethnographic analogy. The political implications of the resulting imputations of "timelessness" and implied "inherent ethnicity" are discussed.

Railey, Jimmy (Washington-St Louis)

[509] SETTLEMENT CYCLES AND SOCIOPOLITICAL NONCHANGE IN THE CENTRAL OHIO VALLEY.

Understanding sociopolitical evolution may be furthered by examining control cases in which large-scale polities did not form or did not endure. In the Woodland and Fort Ancient traditions (ca 800 BC-AD 1700) in the central Ohio River Valley, recurring settlement cycles involving aggregation and dispersal suggest a persistent lack (or repeated failure) of complex polity formation and institutionalized systems of inequality. Based upon the same political foundations, long-term sociopolitical non-change in small-scale societies presents an alternative outcome to the better-known scenarios wherein increasingly complex polities emerge out of presumably linked processes.

Raisch, Carol B (US Forest Service) [Workshop 401]

Ramenofsky, Ann F (see Teltscher, Patrice A) [203]

Ramos, Elizabeth (see Dirkmaat, Dennis) [509]

Ramos Vélez, Marlene (see Hayward, Michele) [208]

Ramsden, Peter (McMaster)

[605] RECONCILING ANTHROPOLOGY, HISTORY, AND ARCHAEOLOGY: THE CASE OF HURON ETHNICITY.

Ethnohistorians have used anthropological theory to interpret historical documents relating to the 17th century Hurons, and to construct a purported 'ethnographic' picture of Huron society. Archaeologists have used both ethnohistory and anthropology to interpret historic and prehistoric Huron archaeological material. This paper suggests a re-examination of the ethnic and linguistic nature of the Hurons, based on an attempt to reconcile archaeological data from south central Ontario with the ethnohistorical interpretation and its anthropological underpinnings.

Rasmussen, Tom (see Barker, Graeme) [108]

Rathje, William L & Barbara A Teso (Arizona)

[703] SURROGATES ARE PALE REFLECTIONS AT BEST.

Everyone's world is comprised of two realities: mental and material. Sadly, one reality cannot be used as a surrogate for the other. Actual foods eaten lead to disease and actual wastes contaminate groundwater. The problem for researchers who study contemporary issues is that what people report they did, or will do or even their attitudes, does not effectively predict their behavior. Behavioral archaeology provides critical baseline data on human existence. Mental and material realities are best approached independently, and attention should be focused on the way each affects the other.

Rattray, Evelyn C (Instituto de Investigaciones Antropológicas, UNAM)

[411] BARRIO ORGANIZATION AT THE TEOTIHUACAN METROPOLIS.

During the 5th and 6th centuries, the Merchants' Barrio at Teotihuacan established and maintained contacts with Puebla, the Gulf Coast, and the Maya, importing ceramics, pigments, cotton, and cacao. The architecture of the barrio, consisting of round houses and storage facilities arranged around plazas with shrines, differs from other areas of the city. Similar structures do exist, however, in the Great Rectangle north of the Ciudadela, surrounded by craft working areas. Evidence is presented that this large open plaza may have served as an outlet and redistribution center tied to the powerful groups residing in the Ciudadela palaces.

Rautman, Alison E (Central Michigan)

[110] SOCIAL STORAGE AND SOCIAL NETWORKS: BALANCED RECIPROCITY AND ASYMMETRICAL EXCHANGE.

The exchange of food, objects, and information within a social network is considered to involve dyadic relationships characterized by balanced reciprocity. In such cases, asymmetrical exchanges create, in Sahlin's terms, a "shadow of indebtedness" that contributes to network continuity. To the

extent that networks function to reduce risk of resource stress, however, continued or marked asymmetry of exchange may destabilize the network, as social costs of maintaining contact with spatially disparate groups outweigh expected benefits. Possible sources and effects of asymmetry in social interactions are evaluated for early agriculturalists (AD 900-1300) in central New Mexico.

Ravesloot, John C (Arizona State) & Clarence M Chiago (Gila River Indian Community)

[202] WORKING TOGETHER TO UNDERSTAND THE PREHISTORY AND HISTORY OF THE GILA RIVER PIMA, ARIZONA.

Members of the Gila River Indian Community have a sincere belief that material remains relating to their past should be protected and left undisturbed. The need for economic development on community lands, however, often necessitates the disturbance of their ancestors' final resting places. The Tribal Council has had many difficult issues to confront with respect to land ownership, economic development, traditional values, and knowledge of their past. This paper chronicles one such case in which an agreement was reached between the Gila River Indian Community and archaeologists that allowed the excavation and study of a prehistoric Hohokam village and historic Piman cemetery.

Ravesloot, John C (see Rice, Glen E) [701]

Raymond, Anan W (see Creger, C Cliff) [410]

Redding, Richard (Michigan)

[308] OLD KINGDOM PATTERNS OF ANIMAL USE AND THE VALUE OF FAUNAL DATA IN MODELING SOCIOECONOMIC SYSTEMS.

Analysis of faunal remains from the Nile Delta site of Kom el-Hisn has yielded a model of Old Kingdom rural animal production tactics. Kom el-Hisn was a locus of specialized, centrally controlled cattle and sheep herding with pigs and goats reared for local consumption. This analysis generates predictions of the structure of a faunal sample from a site provisioned by a central authority. These predictions are tested with the faunal sample from the workers' village at the Giza pyramid complex. A positive test result has important implications for the potential of faunal data in elucidating socioeconomic structure in food producing societies.

Redmond, Brian G (Indiana-Glenn A Black Lab) & Robert G McCullough (Southern Illinois-Carbondale)

[204] FORT ANCIENT ADAPTATION ON THE WESTERN FRONTIER: A REINTERPRETATION OF THE OLIVER PHASE.

Renewed archaeological investigation of Oliver phase culture in southern Indiana has documented an intensive, riverine-oriented adaptation by sedentary village horticulturists dating after AD 1000. Analyses of material culture, settlement-subsistence patterns, and chronology have revealed previously unrecognized affinities with some Fort Ancient tradition complexes in the Middle Ohio Valley. The results of these studies are discussed, and a preliminary model of Oliver phase cultural adaptations is presented.

Redmond, Elsa M (see Spencer, Charles S) [610]

Reed, David (Penn State)

[209] ANCIENT COPAN DIET THROUGH STABLE CARBON AND NITROGEN ISOTOPIC ANALYSIS.

Stable carbon and nitrogen isotope ratios have been obtained from over 100 human and animal bone specimens recovered during the past decade of excavations in the Copan Valley by the Penn State Copan Archaeological Project. Diet, as defined by the isotopic measurements, is shown to concord with indirect measures of diet and models of agricultural potential and demographic change. The sample demonstrates, among other issues, that corn was the dominant staple, contributing 90% of the food during the polity's peak (Coner ceramic phase, AD 700-1100).

Reed, Heidi E, Susan K Stratton & Robert D Leonard (New Mexico)

[304] EXPLAINING SETTLEMENT AGGREGATION: PRELIMINARY RESULTS FROM BADGER SPRINGS, NEW MEXICO.

Using settlement and paleoclimatic data from the Zuni area, we evaluate a model constructed to explain settlement aggregation. Significant variables considered are labor organization and the availability of land and water within the context of specialized agricultural production. We evaluate this model using information recently recorded by the Badger Springs Project on a series of sites which date from AD 600 to 1350 and represent a variety of settlement configurations. We interpret one cluster of sites as settlement aggregation during a critical period of decreased moisture. We argue that this aggregation reflects a change in labor organization necessary to maintain agricultural production levels.

Reed, Judith (National Park Service)

[413] TECHNOLOGIES TO THWART LOOTING AND VANDALISM.

Although a variety of technologies are available to warn potential vandals and to indicate intrusion on an archaeological site, most are expensive and unsuitable for isolated archaeological sites. This paper describes recent advances in adapting technologies to cultural resource protection needs and summarizes several especially effective methods for reducing looting and vandalism. It also discusses the balance law enforcement personnel must reach between the protection of individual rights and protection of cultural resources.

Reid, J Jefferson (Arizona)

[703] FOUR STRATEGIES AFTER TWENTY YEARS: A CRITICAL REAPPRAISAL AND ADJUSTMENT.

The model of four research strategies of behavioral archaeology and the definition of archaeology inherent in this model are evaluated in light of the claims and criticisms of the past twenty years. Essential adjustments to the original formulation expose the dynamic character of the model that makes it relevant to contemporary research directions.

Rice, Don (Southern Illinois-Carbondale)

[407] MODERN AGRICULTURAL ECOLOGY IN THE MAYA LOWLANDS.

Projections of the potential support capability of prehispanic agricultural systems in the central Maya lowlands are often based on productivity figures from modern *milpa* farmers in the region. Similarly, the potentially long-term destructive effects of Maya agriculture are frequently modeled upon observations of current slash-and-burn agricultural practices. Unfortunately, however, available agronomic, ethnographic, and historic data for modern agriculture in the Maya lowlands are highly variable. This paper reviews these data, together with limnological evidence for the environmental impact of modern farming and settlement, and critiques their use in reconstructions of ancient Maya subsistence ecology.

Rice, Glen E, John C Ravesloot & Christy G Turner II (Arizona State)

[701] ETHNIC IDENTITY AND SOCIAL COMPLEXITY: THE BIOCULTURAL APPROACH.

The ethnic identity and social complexity of the Salado continues to be the subject of considerable debate. One major obstacle that has prevented the critical assessment of alternative models is the lack of large and representative samples of Salado burials. Some have suggested that the Salado in the Tonto Basin represent a Hohokam population that evolved from a tribal to a chiefdom level of social organization. An independent comparative study of Salado skeletons has not found the Salado to be closely related to the Mogollon, rather they seem to be more closely related to the Hohokam. This paper presents the preliminary findings of our biocultural research.

Richardson, James B III (Carnegie Museum of Natural History) & James B Petersen (Maine-Farmington)

[709] PALEOINDIAN AND ARCHAIC ADAPTATIONS ON MARTHA'S VINEYARD.

There is a strong Paleoindian occupation on Martha's Vineyard, but an almost complete absence of the Early Archaic on the 100-sq-mile island. The first major population presence is during the Middle Archaic, and by the Late Archaic Martha's Vineyard had a substantial population. The changing patterns of settlement and subsistence are correlated with the environmental and geological changes of the late Pleistocene to the mid-Holocene.

Richardson, James B III (see Moseley, Michael E) [109]

Rife, Joseph L (Kenyon)

[311] POPULATION DIVERSITY AND THE HELLENISTIC TO BYZANTINE OCCUPATION OF ISTHMIA, GREECE.

Since 1967 excavation at the classical site of Isthmia has produced 63 individuals from the West Cemetery and 53 from the Byzantine Fortress. Ceramic chronology suggests that these two populations date from, respectively, the Hellenistic and the Late Roman to Byzantine periods. A comparative craniometric and statistical analysis of these two groups addresses the problem of historic continuity from classical to medieval times. The objective is to determine the degree to which biological distinctions between the populations correlate with artifactual and historic distinctions. Such analysis can elucidate the effect of migration, core-periphery political organization, and/or microevolution on site inhabitants.

Riggs, Brett H (see Schroedl, Gerald) [310]

Righter, Elizabeth C (see Lundberg, Emily R) [503]

Riley, Thomas J (Illinois-Urbana-Champaign)

[301] AN EARLY ARCHAEOLOGICAL EXCAVATION IN ILLINOIS: LEGITIMATION OF THE ARMIES OF ZION IN 1834.

While all New World archaeologists are aware of the relationship of Mormonism and the archaeological monuments of Mesoamerica, few know that Joseph Smith conducted an early exhumation of an aboriginal mound group in Illinois during the spring of 1834. The incident is recorded in a variety of texts by Mormons, Apostates, and Gentiles. In addition to the physical remains Smith experienced a revelation regarding the nature of the remains. In this paper the revelation that accompanied the excavation is explored, and an attempt is made to identify the site and to place the remains from it in an archaeological context with meaning for non-Mormons. The religious dimension of the archaeological landscape for both Mormons and others is explored within the metaphor presented by Smith's excavation and interpretation of the site. The notion of aboriginal America in the 19th-century contested landscape is explored.

Riley, Thomas J (Illinois-Urbana-Champaign) [Discussant 701]

Rinaldi, Milagro (see Spencer, Charles S) [610]

Ritter, Eric (BLM)

[303] SCRATCHED ROCK ART COMPLEXES IN THE DESERT WEST: SYMBOLS FOR SOCIORELIGIOUS COMMUNICATION.

Throughout much of the Desert West occurs the little-known scratched petroglyph tradition. This rock art tradition includes about 12 motifs, mostly geometric, and it occurs in a variety of cultural and environmental settings. The rock art crosscuts time and space, and frequently occurs with pecked motifs. By examining in detail the scratched symbolism and cultural and environmental contexts at a number of sites, and in looking at the ethnographic record, the tradition is hypothesized to have primarily served as a communicative bridge between the socioeconomic and spiritual worlds among various groups, acting as a mechanism for social stability and maintenance.

Rivera, Mario [Discussant 405]

Rivera, Virginia (see Rodriguez, Miguel) [503]

Robb, John E (Michigan)

[108] GENDER, MORAL DYNAMICS, AND EARLY INEQUALITY IN THE ITALIAN NEOLITHIC AND BRONZE AGE.

Gender ideology and the symbolic constitution of individuals has long been overlooked in environment and social structure oriented archaeology; specific ideologies themselves can be potent forces shaping social change. In this paper one such example, Late Neolithic early Bronze Age gender ideology, is reconstructed from prehistoric rock and cave art, stelae, and burial customs. This reconstructed core then provides a generative model both for social practices (patterns of authority, economic intensification, the creation of stigma, and intergroup relations), for the diverse genres of archaeological evidence resulting from them, and for the system's late Bronze Age/Iron Age transformation.

Robertson, Robin (see Walker, Debra S) [706]

Robinson, Paul A (Rhode Island Historical Preservation Commission)

[705] ARCHAEOLOGY, HISTORY, AND CULTURAL RESOURCE MANAGEMENT: PRESERVING THE RICHNESS OF THE PAST.

Cultural resource management is a process used to determine which sites are protected, studied, and what research questions are asked. This process imposes order on the past, rendering it manageable for the present. Attempts to manage the past, however, often diminish its richness and distinctiveness and separate us from others (anthropologists, historians, Indian tribes) who have an interest in preserving and studying the past. Creating an Indian history that embraces the richness of the past will make what we do recognizable and important to these other groups and enable us to better contribute to the study of humanity.

Robles Garcia, Nelly (see Corbett, Jack) [313]

Rocek, Thomas R (Delaware)

[506] SHIFTING PATTERNS OF SEDENTISM AND SEASONALITY AS SEEN IN THE SOUTHWESTERN PITHOUSE TO PUEBLO TRANSITION.

Recent research in the southwestern US challenges the traditional assumption of full sedentary settlement prior to the Pitouse to Pueblo transition. Current approaches include attempts to define the season of occupation for particular sites, or more generally, to identify levels of mobility on sites.

This paper uses the latter approach to suggest seasonal mobility at the Dunlap-Salazar site, a Pithouse period Jornada Mogollon village, in contrast to nearby Pueblo sites. This contrast exists despite a lack of evidence for a corresponding shift in agricultural dependence, which is commonly assumed to accompany increased sedentism.

Rodriguez, Miguel (Institute of Puerto Rican Culture) & Virginia Rivera (SHPO-Ballaja Project)
[503] LATE CERAMIC AGE DIVERSITY IN EASTERN PUERTO RICO.

The current status of archaeological research in the eastern half of Puerto Rico is reviewed, with particular attention given to the Late Ceramic Age cultures: the pre-Tainan (Elenoid or Elenan Ostionoid) and Tainan (Chicoid or Chican Ostionoid). The C-14 chronology, ceramic styles and series, settlement patterns, subsistence adaptations, and ceremonialism of both cultural groups are compared. Also, possible relationships between eastern Puerto Rico and other regions, such as Vieques and the Virgin Islands, western Puerto Rico, and eastern Hispaniola, are explored.

Rogers, Anne, Jane L Brown (Western Carolina) & Michael Barber (Jefferson National Forest)

[412] LITHIC REDUCTION STRATEGIES AT THE PINE RIDGE SITE (44SC95).

The Pine Ridge site (44SC95) is a lithic reduction station located near an outcrop containing small chert nodules. The site appears to have been most extensively utilized during the Paleo-Early Archaic transition. Analysis of lithic materials recovered has provided evidence of reduction techniques as well as of preferred use of raw materials. No indication of either long or short term habitation was recovered, suggesting that the site was used primarily for lithic reduction rather than having this occur as an adjunct to subsistence procurement or other activities.

Rogers, Jerry L (National Park Service) [Discussant 702]

Roler, Kathy & Barbara L Stark (Arizona State)

[313] RECOGNIZING POOR HOUSEHOLDS IN THE ARCHAEOLOGICAL RECORD: A CASE STUDY FROM SOUTHERN VERACRUZ, MEXICO.

Archaeological surveys in lowland Mesoamerica often rely on mounds to locate households and on decorated surface ceramics to date occupations. Recently, test excavations at some Maya sites have uncovered households where no mound was present, raising the possibility that traditional survey and excavation techniques are missing poorer households. A search of the ethnographic literature reveals that relationships between wealth, mobility, and household size may mask the presence of the poorest households archaeologically. An analysis of surface sherds (both decorated ceramics and plainware) from a regional survey in southern Veracruz, Mexico, supports the contention that the poorest households are the most vulnerable to analytical invisibility due to the artifact inventories they leave behind.

Rolett, Barry (Hawai'i-Honolulu)

[511] ARCHAEOZOLOGICAL INTERPRETATION OF ANIMAL HUSBANDRY PRACTICES BASED ON AGE PROFILES OF PREHISTORIC HAWAIIAN PIG AND DOG POPULATIONS.

Control and distribution of surplus food was a central factor in the ability of competing chiefs to achieve and maintain political power in late prehistoric Hawai'i. Intensification of agricultural production was linked closely with herding of domestic pigs and dogs. This study is the first to use archaeozoological analyses of pig and dog bone assemblages for interpreting prehistoric Polynesian cultural practices concerning the management and use of these domestic animals. The faunal remains investigated derive from areal excavation of a coastal habitation site in Waimanalo, O'ahu, occupied during the 17th and early 18th centuries. Age profiles of the pig and dog assemblages are constructed by tooth crown height measurements.

Rolingson, Martha A (Arkansas Archaeological Survey) & Philip Osborne (Toltec Mounds State Park)

[406] DAILY INTERACTION WITH PARK VISITORS: THE TOLTEC MOUNDS EXAMPLE.

Toltec Mounds Archaeological State Park in central Arkansas is managed cooperatively by the Arkansas Department of Parks and Tourism and by the Arkansas Archaeological Survey. The staff has an active interpretation program for the public. A variety of approaches are used but an emphasis is placed on personal interaction with park visitors. All visitors who come to the visitor center are greeted and provided information informally and through formal programs, including daily guided tours and numerous special events held on Saturdays. School classes and organized groups are offered a range of programs to meet their preferences.

Rollins, Harold (Pittsburgh) & Uwe Brand (Brock)

[109] ANCIENT ENSO EVENTS INFERRRED BY BIVALVE SHELL GEOCHEMISTRY: A CRITIQUE.

Geochemical signatures of ENSO events have commonly utilized $\delta^{18}\text{O}$ in corals and bivalves. The $\delta^{13}\text{C}$ values, the occurrence of trace Cd in skeletal carbonate, and the Sr/Na ratio may afford additional

opportunity for retrodiction of mega-ENSO events by assessment, respectively, of rainfall, oceanic productivity, and salinity. Geochemical analyses should be supplemented by evaluation of growth interruption. However, such utilization of bivalve shells is constrained by the generally poor temporal resolution of shell midden stratigraphy, and by limited knowledge of interspecific and interhabitat variation in shell geochemistry and of the effects of diagenetic overprinting.

Rosado-May, Francisco (Centro de Investigaciones de Quintana Roo)

[407] THE MAYA FACTOR IN THE AGRICULTURAL LANDSCAPE: AN IN SITU COMPARISON OF MAYA VS OTHER CULTURES IN QUINTANA ROO, MEXICO.

The Mexican government has carried out an aggressive colonization program since the late 1960s, bringing farmers from completely different ecosystems and backgrounds to Quintana Roo. As a result, a mosaic of agroecosystems are observed. When comparing foreign to local farmers, there are significant differences in farm size, species diversity, non-crop useful species, and input/output ratio. Native farmers have a much broader ecological basis in both their perception of nature and the management of their agroecosystems. Implications for sustainable development are discussed.

Rose, Martin R (see Durand, Stephen R) [514]

Roth, Barbara J (Pima Community)

[304] LAND USE IN THE LATE ARCHAIC OF THE NORTHERN TUCSON BASIN: A VIEW FROM THE UPPER BAJADA.

Interpretations of the Late Archaic occupation of the Tucson Basin have focused on agricultural villages along the river floodplain. However, a regional approach is essential before the role of these agricultural villages can be addressed. Excavations of three Late Archaic sites in the upper bajada (oothills) of the northern Tucson Basin provide information on the occupation of this environmental zone and aid in determining their relationship to floodplain agricultural villages. The results of these excavations are presented, and their implications for reconstructing Late Archaic land use within the Tucson Basin are discussed.

Rothschild, Nan A (see Dublin, Susan) [304]

Rouse, Irving (Yale)

[503] THE WEST INDIAN CHRONOLOGICAL SYSTEM AND ITS APPLICATION TO ANTIGUA IN THE LEeward ISLANDS.

This paper presents a discussion of the nature of the chronological system used in the Greater Antilles and the extension of the system to the Leeward Islands. It explains the two main procedures used to study the Ceramic Age—formulation of ceramic periods and classification of the cultures of those periods into series and subseries. The system is illustrated by applying it to the post-Saladoid finds at Indian Creek and Freeman's Bay on Antigua Island. Pertinent radiocarbon dates also are considered.

Rovner, Irwin (Binary Analytical)

[501] PHYTOLITH PROBLEMS IN TRANSDANUBIAN ARCHAEOLOGY.

Rich phytolith assemblages occur in archaeological contexts throughout the Danube region of Hungary. Archaeological soils and herbivore teeth, dating variously to Neolithic, Bronze Age, Iron Age, Roman, and Medieval sites, yield evidence of climate, diet, agriculture, livestock management, etc. However, particular problems, such as the overwhelming dominance of festucoid grasses in both wild and cultivated taxa, create difficulties in taxonomic differentiation and identification.

Rowe, Marvin (Texas A & M)

[303] RADIOCARBON DATING OF PICTOGRAPHS.

A progress report is presented on our new plasma-chemical technique, which permits us to extract the organic material from a pictograph and subject it to direct radiocarbon dating. We have obtained dates on pictographs, and all are in accord with the archaeological context. Carbon dioxide from a charcoal sample previously dated by Beta Analytic, Inc., was extracted by our technique and radiocarbon dated. The ages differed by only 10 years. Limestone decomposition, mass fractionation, and atmospheric contamination have been examined and found to present no problem to our method.

Rowlands, Michael J (University College-London) [Discussant 603]

Rue, David (3D Environmental Services)

[602] PALYNOLOGICAL STUDIES IN THE COPAN VALLEY.

Evidence of agricultural origins, intensification, and end of cultivation were obtained from two cores collected in western Honduras in 1984. Pollen data from Lake Yojoa indicate the presence of slash and burn agriculture by at least as early as 2000 BC by preceramic people. For the collapse, the

long standing traditional view was a rapid and complete depopulation of rural as well as urban areas soon after AD 900. Pollen data from Petapilla bog near Copan show that reforestation did not occur until after AD 1250. Also indicated by the bog's pollen sequence is complete deforestation in Copan's valley bottom and foothills at the end of the Classic period.

Ruscavage, Samantha (Arizona State)

[410] REFUSE DISPOSAL PATTERNS IN HOHOKAM STRUCTURES.

Many Hohokam structures were filled with trash once they were abandoned. The amount and type of ceramic refuse that accumulates in these structures may help identify roughly contemporaneous house groups and/or differentiate seasonal from permanent occupation. Measures of sherd size and density are used to quantify refuse disposal behavior in pithouses and fieldhouses from AZ:U:6:213, a Hohokam site in the Lower Verde Valley, Arizona.

Russo, Michael (Florida)

[506] MEASURING SEDENTISM WITH FAUNA: A CASE STUDY FROM THE HARRIS ISLAND ARCHAIC, FLORIDA.

In evolutionist models, sedentism often is correlated with cultural complexity. Sedentism can be measured in the absence of traditional markers of complex culture through the development of quantitative measures of seasonality. Faunal assemblages from coastal middens yield statistical requisites for determining seasonality often lacking at terrestrial sites—large numbers of a wide variety of species which vary seasonally in terms of growth phases or demographics. The application of new seasonality measures on these species from a coastal preceramic Archaic site in southwest Florida demonstrates that sedentism occurred at least 3000 years before current models predict.

Ruwell, Mary Elizabeth (National Anthropological Archives)

[615] KEEPING THE ARCHAEOLOGICAL RECORD.

The records documenting WPA archaeology are a good example of more general problems with archival archaeological records. Many of the important records have been scattered among various institutions and many others have disappeared. The records that have been kept are not always easily accessible, usually because of poor storage or because the finding aids are not geared to archaeological applications. Examples will be drawn from various archival experiences and some solutions, particularly those proposed by the Committee for the History of Archaeology, are discussed.

Salzer, Matthew (Eastern New Mexico)

[514] VARIATIONS IN MOGOLLON BROWNWARES.

Excavations at three temporally distinct sites in the Sierra Blanca region of New Mexico provided the opportunity to investigate variation in the morphology and technology of plain brownware ceramics. Using digital image processing and other quantitative techniques, I attempt to demonstrate that certain aspects of shape and production technology are sensitive to temporal variability. Within the region, plain brownware types usually represent the vast majority of ceramics recovered. The use of these utility wares to increase chronological control helps in understanding the role of the Mogollon in southwestern prehistory.

Samford, Patricia M & Marley R Brown III (Colonial Williamsburg)

[606] CURRENT ARCHAEOLOGICAL PERSPECTIVES ON THE GROWTH AND DEVELOPMENT OF WILLIAMSBURG.

Recent archaeological exploration of Williamsburg has emphasized a series of interrelated problems concerning its physical and social development. An excavation strategy that permits the recovery of controlled environmental and spatial data has identified effects of urbanization on the landscape in Williamsburg during the 18th century. The town's physical growth is examined in view of archaeological evidence of changes in land-use patterns and the organization of domestic and commercial space. These changes can be linked to increasing economic specialization and social differentiation of Williamsburg's population, trends that may also be observed in the analysis of selected artifacts and faunal assemblages from these sites.

Sanders, Helen & Harold L Dibble (Pennsylvania)

[211] MORPHOLOGICAL PATTERNING IN MIDDLE PALEOLITHIC TOOLS: EVIDENCE FOR DELIBERATE TYPES?

The question of whether Middle Paleolithic tools were manufactured according to deliberate, discrete types has recently become a source of controversy. One of the principal typological classes, consisting of notches and denticulates, has been under-emphasized in this debate. This paper addresses these issues by measuring patterning in the manufacture of these tools using newly excavated samples from Combe Capelle bas, France.

Sanders, William T (Penn State)

[602] COPAN AND ETHNOGRAPHIC ANALOGY.

In this paper, we attempt to reconstruct the institutions of Late Classic Copan, Honduras, by application of ethnographic models to a massive body of data generated by household archaeology and surface survey. Three kinds of ethnographic models are presented—two using the direct historical approach from both 20th and 16th century Maya, and the other from a broader based survey of cultures from several areas. The rationale for this procedure is presented, emphasizing the strengths and weaknesses of each kind of analogy.

Sanders, William T (Penn State) [Discussant 505]

Sanderson, Stephen K (Indiana-Pennsylvania) [Discussant 206]

Sandweiss, Daniel (Carnegie Museum)

[109] ARCHAEOLOGICAL EVIDENCE FOR A MID-HOLOCENE ORIGIN OF EL NIÑO.

Determining the origin and timing of El Niño events is essential for understanding cultural adaptations to the cold-water Andean coast. Based on tropical shell remains found near Santa, at 9 degrees S, Peru, a hypothesis was advanced some years ago that prior to 5000 BP, permanent warm water extended south to Santa and that El Niño only began after 5000 BP. More recently, long term climatic stability [including El Niño] has been proposed based on studies in the same area. This paper uses data from new excavations at Santa to reevaluate the hypothesis and counter arguments for the mid-Holocene origin of El Niño.

Santley, Robert S (see Arnold, Philip) [313]

Santoro, Calogero (Pittsburgh), Pablo Marquet (New Mexico) & Carlos Baied (Montana)

[305] AN ECOLOGICAL AND CULTURAL OVERVIEW OF PREHISTORIC HUNTERS AND GATHERERS OF THE SOUTHERN ANDEAN SALT AND DRY PUNA.

Previous explanations of prehistoric hunter-gatherer adaptations in the Salt and Dry Puna of the south central Andes have primarily focused on transhumance. However, to sharpen our understanding of regional organization and mobility, we need to examine not only the direction of seasonal movement, but the kinds of settlements generated and the relationships that existed with coastal populations. Based on new cultural, zooarchaeological, and pollen data from the south central Andean Salt and Dry Puna, we examine regional hunter-gatherer organizational strategies within the ecological constraints of these highland environments.

Sassaman, Kenneth E (South Carolina)

[404] CHANGING STRATEGIES OF BIFACE PRODUCTION IN THE SOUTH CAROLINA COASTAL PLAIN.

Bifaces served similar functions but different organizational roles over the millennia of southeastern prehistory. Evidence for these roles is found in strategies of biface production. In the South Carolina coastal plain, biface production varied in scale, degree of specialization, and in location relative to quarries. These differences can be related to changes in settlement mobility, subsistence scheduling, labor organization, and social complexity. While the meager lithic resources of the coastal plain placed some constraints on the options of tool-makers, strategies of tool design, site provisioning, and lithic scavenging were effective in overcoming the limitations of a stone-poor environment.

Sasso, Robert F (Wisconsin-Parkside)

[204] LA CROSSE REGION ONEOTA ADAPTATIONS: CHANGING LATE PREHISTORIC SUBSISTENCE AND SETTLEMENT PATTERNS IN THE UPPER MISSISSIPPI VALLEY.

Regional archaeological surveys and extensive excavations in western Wisconsin, northeastern Iowa, and southeastern Minnesota have yielded a large volume of data indicating late prehistoric changes in human adaptation to the La Crosse region of the Upper Mississippi Valley. Oneota settlements appear clustered, and their subsistence practices intensified in comparison to regional Woodland manifestations. These significant changes are viewed in relation to a series of environmental, technological, social, and demographic factors, including maize agriculture, availability of large mammal resources, bow-and-arrow technology, and intergroup raiding and/or warfare.

Sasso, Robert F (Wisconsin-Parkside) & James A Brown (Northwestern)

[102] IN BACK OF HISTORY ON THE EASTERN PLAINS.

While the period of French control or domination of the Prairie Peninsula east of the Mississippi was characterized by a fluidity of tribal location, basic patterns of subsistence and settlement geography remained largely intact. These patterns had roots reaching back at least a millennium. Rather than dwelling on the confusing problem of ethnohistorical connections of archaeological complexes, continuity in the basic pattern of tribal organization deserves attention. Although continuity predominated,

archaeological research has shown that well-defined shifts in subsistence and settlement have taken place since the introduction of maize cultivation. These changes inform us on social and economic processes that have shaped realities on the prairies for some time.

Satterlee, Dennis (Florida)

[109] CULTURAL DISRUPTION BY PREHISTORIC AND EARLY HISTORIC EL NIÑO FLOOD EVENTS IN THE OSMORE DRAINAGE, ILO PERU.

As demonstrated by the 1925-26 and the 1982-83 El Niños, the hyperarid coast of Peru is no stranger to large devastating flood events. Recently discovered evidence clearly shows that ca 1360 AD an even larger ENSO-driven flood destroyed the largest native irrigated agricultural system to have ever operated in the lower Osmore drainage near Ilo, Peru. Again in ca 1670 AD another very strong El Niño severely damaged the Spanish Colonial agrarian system operating in the same valley.

Saucier, Roger (see Nickens, Paul) [707]

Savelle, James (McGill)

[312] THE DETERMINATION OF CULTURAL VS NATURAL WHALE BONE ASSEMBLAGES.

Archaeological and geological investigations in the Canadian Arctic provide a case study in the identification of culturally derived vs naturally derived whale bone assemblages. Relative frequencies, intrasite distribution, modification, and geomorphological context of bone elements differ significantly between Thule Eskimo (ca AD 1000-1400) bowhead whale processing sites and early Holocene bowhead whale natural stranding sites. These differences are demonstrated to relate to the logistics of whale retrieval and butchering, and element utility, in the case of the Thule processing sites, and to marine coastal processes in the case of the natural stranding sites.

Scarry, C Margaret (Kentucky) & Vincas P Steponaitis (North Carolina-Chapel Hill)

[402] BETWEEN FARMSTEAD AND CENTER: THE NATURAL AND SOCIAL LANDSCAPE OF MOUNDVILLE.

About AD 1000 people living in the Black Warrior Valley of Alabama reorganized their social, political, and economic relations. Their efforts resulted in what we know archaeologically as the Moundville chiefdom. Past research on Moundville focused on the development of its agricultural base and on the social and political ties between Moundville and its subsidiary centers. Little attention has been given to the economic and political relations of the people who lived in farmsteads. We use archaeobotanical data and other archaeological evidence to examine the relationships of the people living in farmsteads to their natural and social environments.

Scarry, John (Kentucky)

[403] HOW GREAT WERE THE SOUTHEASTERN POLITIES? ECONOMY, SCALE, AND COMPLEXITY AMONG THE MISSISSIPPIAN SOCIETIES.

Evidence of the scale and complexity of the Mississippian polities can be obtained from data on site size and distribution. These data suggest that the cultural geography of the late prehistoric Southeast was highly varied. Overall, the polities were neither as complex as some have argued nor as simple as others would suggest. Evidence of the economies of the Mississippian societies obtained from material culture and subsistence remains reveals significant variation in production and exchange. Nevertheless, the polities shared a reliance on subsistence strategies capable of producing surpluses that could be used in political and social arenas.

Schelberg, John (Corps of Engineers)

[707] UNDERSTANDING UNDIAGNOSTIC LITHIC SCATTERS IN NORTH-CENTRAL NEW MEXICO THROUGH OBSIDIAN HYDRATION ANALYSIS.

Lithic scatters, 65% of which are undiagnostic, comprise the largest category of sites at Abiquiu Reservoir in New Mexico. During two mitigation projects over 760 hydration dates from tools and debitage from surface and subsurface contexts at 54 sites were obtained. Project goals included establishing obsidian hydration curves for Jemez Mountain varieties, verifying dates of the Oshara sequence, isolating activity areas, etc. Results suggest several overlapping use episodes rather than discrete activity areas. Multiple dates from single artifacts indicate reuse through time. Anasazi period dates on typologically Archaic period points suggest hunting by agriculturalists.

Schiffer, Michael Brian (Arizona)

[703] A SPECTACULAR FLOP: THE ELECTRIC AUTOMOBILE IN AMERICA, 1895-1915.

In the year 1900, more electric automobiles were registered in the US than those powered by gasoline or steam. By 1915, electrics—though regarded by many knowledgeable people as a “perfected” technology—had dwindled to less than 1% of the automobile assemblage. This paper presents an explanatory sketch that accounts for the early demise of this promising technology.

Schmitt, Dave N (Dames & Moore) & Charles D Zeier (Resource Concepts)

[612] GRANTSVILLE ZOOARCHEOLOGY: FAUNAL QUANTITY, VARIETY, AND QUALITY IN AN ISOLATED HISTORIC MINING COMMUNITY.

Archaeological excavations in the historic townsite of Grantsville, Nevada, were conducted in a variety of contexts including dugouts, houses, and a blacksmith shop. Investigations at 12 features recovered an abundant yet spatially variable assemblage of food bones, largely represented by domestic taxa. The resultant collections offer the potential to explore systemic and consumer related relationships affecting intra-feature assemblage variability through the comparative analysis of faunal quantity, variety, and quality. Mid- to late-19th century foodways also are reviewed to derive implications for archaeofaunal assemblages. This information then is employed to interpret variation observed among the features at Grantsville, including differences in household composition and economic means.

Schneider, Fred (North Dakota)

[314] PREHISTORIC HORTICULTURE IN THE NORTHEASTERN PLAINS: EVIDENCE AND INTERPRETATION.

Recognition of prehistoric horticulture in the northeastern Plains has been hindered by comparison of the region's archaeological sites to Plains Village sites of the Missouri River Valley, the stereotype of the region's native peoples as bison hunters, suggestions that the climate was not conducive to horticulture, the lack of experimental observations, and the lack of appropriate techniques for the recovery of archaeological plant remains. Recent investigations indicate that forager-farmers were practicing horticulture in the region by AD 1200 and into the early historic period.

Schortman, Edward & Patricia A Urban (Kenyon)

[206] THE ECONOMIC BASES OF ELITE POWER: THE RISE AND FALL OF THE LA SIERRA POLITY, NW HONDURAS.

Recent research in the Naco Valley, NW Honduras, indicates that political centralization over the 96 km² region in the Late Classic (AD 600-950) was facilitated by paramount elite monopolies over the acquisition, production, and distribution of generally needed goods. The Naco polity, therefore, seems to be a specific example of a prestige good economy wherein most of the population depends on their rulers for essential commodities. This paper examines the data supporting the above statements and considers the specific problems prestige good systems may experience in sustaining continued growth in population and sociopolitical complexity.

Schroeder, Sissel & George R Milner (Penn State)

[403] MODELING MISSISSIPPIAN SOCIOPOLITICAL LANDSCAPES: SCALE, ORGANIZATION, AND STABILITY.

Alternative models of Mississippian sociopolitical organization have proliferated over the past few decades. New perspectives have evolved in tandem with the rapid accumulation of information on regional site distributions, internal site organizations, artifact assemblages, and cultural sequences. Various ideas about the geographical scale, political and economic structure, interregional interaction, and the long term stability of Mississippian societies are compared. The largest of these systems, dominated by the Cahokia site, is emphasized. Recent work shows that late prehistoric polities of the Southeast varied greatly in size and scale of complexity, and regions were characterized by fluctuating sociopolitical and demographic histories.

Schroedl, Gerald & Brett H Riggs (Tennessee)

[310] CHEROKEE VILLAGE PATTERNING AT THE CHATTOOGA SITE (380C18).

Surface collections, test pits, magnetometer survey, and excavations have been used during three field seasons to identify village patterning at the Cherokee lower town of Chattooga. A 74-meter-square excavation of the council house revealed a portion of the exterior wall, roof supports, interior benches, floor, and central hearth. These features indicate at least three superimposed buildings at this location; the most recent predates 1740. It is possible to identify discrete artifact patterns associated with the last building because the floor was preserved when the structure burned. The structure is comparable in plan to mid-18th century Overhill Cherokee townhouses.

Schuldenrein, Joseph (Geoarcheology Research Associates)

[112] THE GEOARCHAEOLOGY OF PENNSYLVANIA DRAINAGES: GUIDELINES FOR RESEARCH AND CRM PLANNING.

The relationships between prehistoric sites and floodplain landscapes have been explored by Pennsylvania archaeologists for over 100 years. In the past decade CRM and other research projects have demonstrated correlations between floodplain histories and discrete prehistoric components along the larger drainages. The state's key river and tributary systems—the Delaware, Susquehanna, and

Ohio—have been widely sampled and provide dated sequences and reconstructed floodplain histories. It is possible to identify Holocene alluviation, soil formation, and erosional phases and index them against prehistoric occupation records. Limited attempts can be directed towards inter-basin geoarchaeological syntheses across the state. These may help to guide state-wide research designs and cultural resource management plans.

Scott, Barbara G (Minnesota)

[408] THE VIKING MOVE WEST: TRANSPLANTATION OR INNOVATION?

The Norse settlement of the North Atlantic in the Viking and Medieval periods has usually been thought to exhibit great continuity with the contemporary settlement pattern and social structure in Norway, particularly western Norway. Recent fieldwork in these areas and a reassessment of older data, especially house sites, are contributing to a more complicated picture of Viking/Norse society at home and in the new settlements. This paper explores some of the new data and their implications for the question of continuity and change in western Norse society.

Scott, Susan L (see Jackson, H Edwin) [508]

Seifert, Donna J (see Cheek, Charles D) [606]

Senior, Louise (Arizona)

[207] MEASUREMENTS OF CERAMIC INPUT AND OUTPUT: CORRELATIONS WITH SOCIOPOLITICAL CHANGE AT TELL LEILAN.

Diachronic change in ceramic craft specialist inputs (labor and resources) and ceramic outputs are well correlated with independently documented sociopolitical developments (urbanization and state formation) at Tell Leilan in the mid-third millennium. The tempo and mode of technological change in ceramics at Tell Leilan suggest that there is considerable lag in ceramic change and that different aspects of archaeological assemblages "evolve" at different rates during periods of sociopolitical change.

Senior, Louise (Arizona)

[703] THE ESTIMATION OF PREHISTORIC VALUES: CRACKED POT IDEAS IN ARCHAEOLOGY.

Understanding the emic value of prehistoric goods is important to many models of social evolution of complex societies. This paper utilizes a behavioral approach to explore the value of pottery in its technological, sociological, and ideological aspects. Emic value is operationalized through an analysis of pottery mending holes and mending technology. Illustrative examples include historic pots collected from the Raramuri of Chihuahua, Mexico, as well as prehistoric pottery assemblages from the Grasshopper and Homol'ovi III pueblos of the US Southwest.

Shackel, Paul A (Harpers Ferry)

[606] THE MATERIAL REIFICATION OF FACTORY DISCIPLINE AND RESISTANCE IN EARLY INDUSTRIAL SOCIETY.

The Harpers Ferry Armory was established at the conjunction of the Shenandoah and Potomac Rivers in 1798. Factory discipline was not readily accepted at Harpers Ferry. Unlike many northeastern industrial towns, southern rural Harpers Ferry's manufacturing, domestic life, and cultural landscape was unplanned, undisciplined, and organized according to different priorities and cultural constraints. A material culture analysis demonstrates that material surroundings created and reinforced resistance to an industrial discipline that often was accepted in the Northeast.

Shackley, M Steven (UC-Berkeley)

[604] RANGE AND MOBILITY IN THE EARLY HUNTER-GATHERER SOUTHWEST.

One of the most important factors in the reconstruction of hunter-gatherer settlement mobility is an understanding of the potential range and habitat exploited in a year or series of years. In the Southwest, virtually no research effort has been expended to investigate the character and extent of hunter-gatherer procurement ranges. The source provenience of obsidian artifacts recovered from a number of Middle and Late Archaic sites in Arizona coupled with an examination of ethnographic hunter-gatherer data in the same region are rallied to reconstruct the probable ranges used during these periods. The strong upland/lowland composition of these relatively large ranges appears rather typical of hunter-gatherer organization in arid environments worldwide.

Shackley, M Steven (see Peterson, Jane) [210]

Shaffer, Gary (Maryland Historical Trust)

[108] CONTRIBUTIONS TO THEORIES OF ARCHITECTURAL STABILITY AND CHANGE FROM SOUTHERN ITALY.

Neolithic wattle-and-daub buildings from Calabria, Italy, evidence several forms of constructional variability. Despite this prehistoric architectural dynamism, and later prehistoric and historic intro-

ductions of alternative building materials and technologies, wattle-and-daub structures persisted and remained largely similar in the study area into the 20th century. Explanations for this architectural stability in the face of change focus on social, economic, and natural environmental factors.

Shaw, Chester (Navajo Nation Archaeology)

[604] THE EARLY CERAMIC PERIOD IN THE TUCSON BASIN: VARIATION ON A LATE ARCHAIC THEME OR A PRODUCT OF OUTSIDE INFLUENCES?

Evidence from the Tucson Basin suggests the appearance of elements associated with settled village life in the Southwest by the Late Archaic (4000 BP-AD 100-200). Between AD 100-600, evidence suggests a form of village life with elements integral to the Late Archaic but unique in many respects. Were the temporal differences in these village forms a product of variation on an already emerging Late Archaic theme, or were they a product of outside influences? Here both alternatives are explored. The latter view is accorded fuller treatment given a model for better understanding Tucson Basin prehistory when tribal social formation may have just begun.

Shaw, Leslie C (Massachusetts-Boston)

[709] THE WILLOWBEND SITE: COLD-WEATHER ADAPTATIONS TO SOUTHERN CAPE COD, MASSACHUSETTS.

The evaluation of the Willowbend site (19-BN-286), a well-stratified multicomponent site on southern Cape Cod, has provided new insights into prehistoric coastal adaptations and the stylistic affinities of the Woodland period populations in southern New England. While the early occupation of the site reflects short-term and special-purpose use, the extensive Middle Woodland (2000-1050 BP) occupation indicates repeated cold-weather encampments which were stratigraphically situated to maximize access to diverse habitats and for protection from the weather. The significance of the Willowbend site is discussed with reference to the extensive artifact assemblage and the spatial and temporal data recovered.

Sheehy, James J (Penn State)

[505] THE ORGANIZATION OF CERAMIC PRODUCTION AT TEOTIHUACAN: A COMPARATIVE PERSPECTIVE.

Ceramic production in urban centers is complex and may assume a variety of organizational forms. This appears true for Middle Horizon Teotihuacan. At one level, the surface collections by the Teotihuacan Mapping Project have shed light on ceramic production in the city as a whole. At another level, analysis of ceramics from excavations in the Tlajinga 33 workshop has increased understanding of the organization of ceramic production at the family level. This paper evaluates these data on ceramic production by comparing them to organizational models derived from ethnographic, ethnohistoric, and historic materials from Mesoamerica and the Old World.

Sheets, Payson D (Colorado-Boulder)

[105] THE GARDENS AND MILPAS OF CEREN.

The Cerén inhabitants utilized many plant species for food, fiber, pigments, and construction. Planting was on low artificial ridges that follow the architectural orientation of the site, 30° east of north. Two milpas have mature shucked and unshucked ears on doubled over stalks, yet another has juvenile corn in a second planting. Agave ("maguey"), "macoyas," cacao (chocolate), bromeliaceae, and possible manioc have been found in gardens. Gardens begin just beyond the driplines of thatch roofs or the edges of walkways. Annuals indicate the eruption probably occurred in August. Species were planted in particular zones.

Shelley, Phillip (Eastern New Mexico)

[502] ARCHAEOLOGY AND PALEOECOLOGY OF THE FORT STANTON RESERVATION.

The results of multidisciplinary research on the Bureau of Land Management's Fort Stanton Reservation in south central New Mexico indicate the existence and exploitation of a more mesic ecosystem between AD 1150 and 1422 than existed in the area historically. Plant macro and micro fossils reveal a mixed horticultural and wild plant collecting economy in a riparian environment. The presence of relatively small communities and dispersed settlement patterns suggests low local population densities in comparison to contemporaneous areas of the Southwest. These patterns may account for the lack of evidence for prehistoric land degradation and the relatively late Mogollon occupation of the area.

Shelley, Steven D (see Altschul, Jeffrey H) [701]

Sherbondy, Jeanette E (Dumbarton Oaks)

[704] WATER AND LINES: INCAIC HYDRAULIC ORGANIZATION OF THE CUZCO VALLEY.

The hydraulic organization of the Valley of Cuzco, capital of the Inca empire (AD 1438-1532), utilized three cosmological principles to integrate space: duality, quadruplicity, and radial directions.

Each of these principles had a social, political, and ritual dimension. The ceque system, a set of radial sightlines emanating from the center of Cuzco, divided the valley into sectors that mapped sacred places and the rights of social groupings to irrigation systems. Small Inca villages used similar organizational principles, but the capital city demonstrates its most complex manifestation.

Shimada, Izumi (Harvard-Peabody)

[111] SICAN SHAFTTOMBS AND THEIR BROADER IMPLICATIONS.

For decades numerous Middle Sican (ca 1000-1100) tombs in Batan Grande, north Peru, have been looted for sumptuary offerings. Recent excavations at the site of Sican, the inferred capital, document for the first time the magnitude and complexity of the Sican elite shafttombs that reached depths of ca 15 m. Overall variability in Sican tomb construction and contents is impressive and is examined in regard to social and economic organization and external trade.

Siegel, Peter E (Centro de Investigaciones Indígenas de Puerto Rico)

[415] LOWLAND COSMOLOGY AS AN INTERPRETIVE FRAMEWORK FOR PREHISTORIC COMMUNITY ORGANIZATION: THE MAISABEL SITE, PUERTO RICO.

Archaeologists working in lowland South America and the West Indies recognize the importance of cosmology in their interpretations of prehistoric societies. Site structure is an important manifestation of ancient cosmology. A methodological challenge is to excavate sites for reliable information on community organization. I present the results of one such study. Maisabel (Puerto Rico) is a large early ceramic-age settlement intensively occupied for 12 centuries. Site structural data and ethnographic analogy to appropriate lowland communities are used to develop a model for the cosmological organization of Maisabel. Cosmology was a major component in the integration of settlement organization, spatially and temporally.

Siegel, Peter E (Centro de Investigaciones Indígenas de Puerto Rico) [Discussant 503]

Silverman, Helaine (Illinois-Urbana-Champaign)

[301] THE NAZCA LINES AS CULT ARCHAEOLOGY, ECONOMICS, AND POLITICS.

To many, it seems impossible that the ancestors of the native Peruvians could have created something as vast in scale and geometrical accuracy as the geoglyphs of Nazca. This attitude is not restricted to the Nazca Lines but characterizes other ancient phenomena such as the pyramids of Egypt, the megaliths of Europe, and the colossal statues of Easter Island. In the case of the Nazca Lines, maintenance of the archaeological past in the realm of mystery has significant economic and political benefits for the modern Peruvian nation-state, but generates negative attitudes of cultural and ethnic identity among Peru's majority mestizo and Indian population.

Simek, Jan F (Tennessee)

[103] SITE STRUCTURE VARIABILITY IN THE UPPER PALEOLITHIC AT LE FLAGEOLET I (DORDOGNE, FRANCE).

Six Upper Paleolithic levels from the rockshelter Le Flageolet I are analyzed using a k-means based clustering algorithm. Similarities and differences in spatial structure of artifacts are noted and related to interior site topography, cultural chronology, and site function. Basic differences in site use based on topographic features are observed between the two main Early Upper Paleolithic traditions represented in the shelter, the Perigordian and Aurignacian.

Simek, Jan F (Tennessee) [Discussant 404]

Simmons, Alan (Desert Research Institute)

[213] 'AIN GHAZAL, JORDAN, IN REGIONAL AND ECOLOGICAL PERSPECTIVE.

'Ain Ghazal, a huge Neolithic village in central Jordan, was probably a self-sufficient settlement, but it is unlikely that it functioned in a vacuum. This paper examines the greater 'Ain Ghazal community and possible interactions with other large Neolithic manifestations, addressing two aspects: 1) the implications of the 'Ain Ghazal survey, which located only a few small Neolithic sites, and 2) the relationship of 'Ain Ghazal to large Neolithic settlements such as Jericho and Wadi Shu'eib. The adaptive implications for late Neolithic settlement and land use patterns are then addressed from an ecological perspective.

Simon, Arleya W (Arizona State)

[701] THE ORGANIZATION OF CERAMIC PRODUCTION AND DISTRIBUTION.

Determining the degree of integration among central communities and surrounding villages is essential to the study of sociopolitical development. The Salado ceramic wares represented in the archaeological record of the Tonto Basin of central Arizona (including Gila polychromes, corrugated, and utility ceramics dating from ca AD 1100-1400) are used to identify site-specific production and

spheres of distribution. Vessel morphology and mineralogical and chemical sourcing evidence are used to examine models of production and distribution within an integrated, systematic framework.

Simon, Brona G (Massachusetts Historical Commission) [Discussant 101]

Sinclair, Rolf M (National Science Foundation)

[410] ARCHITECTURE AND ENGINEERING AS TOKENS OF THE SPREAD OF TECHNIQUES AND CONCEPTS IN THE PREHISTORIC SOUTHWEST.

Recent studies show that accurate, thorough surveys are necessary to understand the full complexity of the architectural and engineering information present in a number of prehistoric constructions in the US Southwest. Many contain features that required extra investments of time and effort (beyond that needed to achieve utilitarian goals) that can be taken as a quantitative measure of the importance of certain cultural concepts. The presence of such features can be used to map the spread of the corresponding architectural/engineering concepts. Examples from the Southwest and elsewhere are presented.

Singleton, Theresa (Smithsonian) [Discussant 104]

Skibo, James M (see Nielsen, Axel E) [703]

Small, David B (Lehigh)

[507] INCOMPLETE FORMATIONS: A COMPARISON OF THE CLASSICAL GREEK AND MAYA.

Preexisting elite networks affect the ability of small states to fully develop many economic, political, or military institutions. The ancient Greek and Classic lowland Maya cultures share features of multiple contemporaneous small state development, strong interstate elite connections, and truncated state institutions. This paper compares the effect that elite networks had on state formation in these two cultures. It isolates aspects of the archaeological record of each culture and demonstrates how this type of state formation may be archaeologically analyzed.

Smiley, Francis E (Southern Illinois-Carbondale)

[205] THE AGRICULTURAL TRANSITION IN THE NORTHERN SOUTHWEST: SIMULATION APPROACHES AND CHRONOMETRIC DATA.

Anthropologists use innovation, diffusion, and migration models from a broad range of disciplines to inform and formulate data-gathering and interpretive efforts. The transition to agriculture, that is the spread of the materials and technology of food production across broad regional space, constitutes an important general case. The agricultural transition across the American Southwest prior to 3000 BP may have occurred in a rapid diffusion pulse apparently followed by a millennium or more of relative demographic and technological stability. Computer simulations provide perspective and insight into the mechanics, enabling, and constraining factors in the development of the earliest Anasazi.

Smith, Bruce D (Smithsonian)

[402] THE INITIAL DOMESTICATION OF PLANTS IN EASTERN NORTH AMERICA: ISSUES OF GENDER AND INTENTIONALITY.

First presented by the author in 1986, a detailed theory accounting for the initial domestication of seed plants in eastern North America has recently been the target of gender specific gloss-critiques by the archaeologists Watson and Kennedy, and the philosopher Wylie. These critical analyses highlight a number of interesting and important aspects of alternative frameworks of explanation that can be constructed around this complex developmental process. In a gender neutral response, this paper employs a parallel mode of analysis and interpretive tone to consider and correct mischaracterizations and errors of logic and fact in these gloss-critiques, and in the process to further address a number of the broader issues that they raise.

Smith, Bruce D (Smithsonian) [Discussant 302]

Smith, Bruce D (Smithsonian) [Discussant 506]

Smith, Marvin T (South Alabama)

[102] THE RISE AND FALL OF COOSA, AD 1350-1700.

Following the collapse of the Etowah polity, the Coosawattee Valley of northern Georgia gradually became the focal point of political power in the Southern Ridge and Valley physiographic environment. Population growth apparently fueled the consolidation of political power, leading to a paramount chiefdom controlling an area from east-central Tennessee to central Alabama by the time of the Hernando De Soto entrada in 1540. In the wake of De Soto, the system collapsed—severe depopulation brought about by European disease and subsequent political collapse dramatically changed the nature

of society. A series of population movements took place, and by AD 1700 Coosa was little more than a town in the Creek confederacy.

Smith, Marvin T (see Milner, George R) [102]

Smyth, Michael P (Cincinnati) & Christopher D Dore (Texas Tech)

[411] PREHISPANIC MAYA COMMUNITY ORGANIZATION: A LARGE SITE BEHAVIORAL APPROACH

Traditional models describing Prehispanic Maya community organization have been based upon vague ethnohistories and the morphology of architectural elaboration. Large-scale surface collections at the Terminal Classic Maya center of Sayil are beginning to provide independent behavioral data related to site activities necessary for interpreting those components that characterize Maya communities. Important elements of the community such as sociopolitical differentiations are examined by comparing broad-scale surface collections and architectural elaboration across the site of Sayil. These data imply that a behavioral perspective is essential for interpreting site-scale settlement patterns related to the organization of past Maya communities.

Snead, James (see Head, Genevieve) [110]

Snow, Dean R (SUNY-Albany)

[102] EVOLUTION OF THE MOHAWK IROQUOIS.

The Northern Iroquoians intruded into the lower Great Lakes region from the unglaciated Appalachian uplands sometime around AD 900. By AD 1450 they were established in small villages throughout the range known for 16th-century Iroquoian nations. After that date the Mohawks emerged as a political entity through processes involving simultaneous nucleation at the regional, village, and household levels. A cluster of large defensible Mohawk villages formed west of modern Albany, and the Mohawks became founding members of the Iroquois confederacy. Epidemics that began in the 1630s caused a steep population decline, but the Mohawks (unlike several other Iroquoian nations) survived beyond AD 1700. They are more numerous today than at any time in the past.

Snow, Dean R (SUNY-Albany) [Discussant 512]

Snow, Susan (UCLA)

[610] CONSTELLATIONS AND COSMOLOGICAL DEVELOPMENT IN THE NEW WORLD TROPICS.

This paper focuses on the role and primary functions of constellations in the cosmologies of the New World tropics, particularly those functions which are shared by various ethnic groups within the region. Any anomalies to these common functions and identifications also are noted. Using ethnographic, ethnohistoric, and archaeological data, this paper discusses possible reasons for these common practices and anomalies, particularly in view of the hypothesis that common environmental features provide models for the development of similar cosmological and social structures in otherwise different ethnic groups.

Sobolik, Kristin D (see Whelan, Mary K) [607]

Soffer, Olga (Illinois-Urbana-Champaign), J M Adovasio (Mercyhurst/SMU) & N L Kornietz (IGN ANU)

[211] MAMMOTH BONE DWELLINGS: OPEN DOORS IN PERIGLACIAL TIMES?

Dwellings made of mammoth bones were a ubiquitous feature at East European Upper Paleolithic sites. Although they have been found at 14 sites on the East European Plain, the question of how they were entered remained a matter of conjecture as none yielded unequivocal evidence for doorways. Our 1991 research at Mezhirich in the Ukraine has produced the first direct evidence for how such structures were accessed and revealed that their late Pleistocene occupants entered them through subterranean tunnels much like those recorded for a number of historic (e.g., central Eskimo) and prehistoric groups (e.g., Basketmaker, Thule) in northern latitudes. The discovery calls for a major revision in how these dwellings are reconstructed in our popular literature, textbooks, and museum displays.

Soffer, Olga (see Adovasio, J M) [211]

Speedy, D Scott (Flowerdew Hundred Foundation) & William C Johnson (Michael Baker Jr)

[605] CORDAGE TWIST DIRECTION AS A TOOL IN DELINEATING TERRITORIAL BOUNDARIES DURING THE LATE WOODLAND AND LATE PREHISTORIC PERIODS IN THE UPPER OHIO RIVER VALLEY.

Cordage twist directions preserved on the surfaces of ceramics are useful for delineating group or tribal territory and for demonstrating population continuity or replacement during the Woodland and

late prehistoric periods in the Ohio Valley. Twist direction of cordage implies that several distinct populations are recognizable within late prehistoric Monongahela culture, apparently representing *in situ* developments from distinctive Late Woodland bases. Minor variations in the relative frequency of the predominant cordage twist direction, peculiar to geographic/drainage basin subareas, suggest that twist direction may function as population signatures permitting identification of individual or related village removals that may be equitable to tribes.

Spence, Michael W (Western Ontario)

[505] A COMPARATIVE ANALYSIS OF ETHNIC ENCLAVES.

Like any great city, Teotihuacan had a variety of ethnically distinct residents. At least two such groups, immigrants from the Valley of Oaxaca and the Gulf Coast, lived in separate enclaves and maintained specialized economies for centuries. These, and some of the less clearly identified ethnic groups of Teotihuacan, are compared with one another and with enclaves elsewhere in Mesoamerica and in the Old World. There are a number of features that differentiate enclaves, suggesting variation in their organization, functions, and articulation with the host society.

Spencer, Charles S, Elsa M Redmond (American Museum of Natural History) & Milagro Rinaldi (Instituto Venezolano de Investigaciones Científicas)

[610] PREHISPANIC DRAINED-FIELD AGRICULTURE IN BARINAS, VENEZUELA: A REGIONAL PERSPECTIVE.

A prehispanic drained-field system in Barinas, Venezuela, is described in terms of its morphology and probable operation, as well as its possible role in a regional settlement system dating to AD 550-1000. Also discussed are the results of a pollen analysis that compared samples from the drained fields and a contemporaneously occupied village site.

Spencer-Wood, Suzanne M (Information Dynamics)

[504] TOWARDS A FEMINIST URBAN ARCHAEOLOGY.

This paper focuses on the implications of feminist theory and research for urban archaeology. My feminist urban research has revealed new types of domestic reform sites and ideological meanings of material culture that were previously unknown. Ordinary as well as innovative material culture was used to symbolize and implement domestic reform across the US. These ideological meanings need to be reconsidered in relation to other factors, such as those previously considered in my systems model of consumer choice.

Spetzler, Hartmut A W & David B Tucker (Colorado-Boulder)

[105] GEOPHYSICAL PROSPECTING: THE USE OF ELECTRICAL RESISTIVITY.

The Cerén Project has utilized various methods of remote sensing, including ground penetrating radar, seismic refraction, and electrical resistivity profiling. Of these, the latter has been used most extensively with varying results. Initially, simple interpretation suggested that resistivity was an effective means of detecting buried structures, but now that effectiveness is in question. This paper reviews the resistivity data in conjunction with subsequent excavation data. Its effectiveness is more clearly demonstrated, and suggestions for future applications are made. The range of applicability for archaeological prospecting is discussed.

Spores, Ronald (Vanderbilt)

[306] TUTUTEPEC: A POSTCLASSIC MIXTEC CONQUEST STATE.

During the 15th and early 16th centuries the Pacific coast of Oaxaca was dominated politically by a Mixtec expansionist state with its capitol at Tututepec. Tututepec successfully resisted incorporation into the Aztec empire and militarily threatened many regions including the Valley of Oaxaca. This paper examines the origins, development, and structure of the Tututepec "empire." A major focus is Tututepec's development from a traditional *seniorio* into a conquest state with administrative and military capabilities sufficient to control a multi-ethnic area of approximately 15,000 km². Comparisons with other polities and areas also are discussed.

Sprague, Rae & Lori A Frye (Archaeological Services Consultants)

[409] A MULTIVARIATE APPROACH TO EVALUATING THE SOCIO-ECONOMIC STATUS OF RESIDENTIAL LOTS.

In a commercial pottery center such as East Liverpool, where individuals had ample opportunity to acquire locally made ceramics, other non-traditional research methods are necessary to measure socio-economic status. Two late 19th to early 20th century lots were examined using a multivariate approach to measure social status. One lot was owned by a banker and the other by an officer of a glass company. Utilizing archaeological data from these sites, this paper focuses on evidence which indicates social status, including privy data, yard treatment, house size, and exchange networks. These data are compared with temporally similar sites.

*Stallings, Richard J (Cultural Horizons)***[214] PREDICTIVE MODELING USING A GEOGRAPHIC INFORMATION SYSTEM AND LANDSAT IMAGERY: A FINAL REPORT.**

A GIS-based predictive modeling research project for a portion of the Yazoo Basin, Mississippi, recently was completed. Initially, a number of databases ranging from stream order and location to a hydric soils database prepared by the US Army Corps of Engineers were evaluated. The investigation showed that, in areas with exposed soils, less than 30% of the total survey area accounts for over 70% of the site area. The data also show a change in site location characteristics from the Archaic to Woodland periods. It is suspected that this change is more a reflection of geomorphic processes rather than cultural preferences.

*Stanfill, Alan (Advisory Council on Historic Preservation)***[101] RESEARCH DESIGNS FOR TREATING ARCHAEOLOGICAL PROPERTIES.**

The staff of the Advisory Council on Historic Preservation is in the unique position of reviewing archaeological research designs developed for properties in all fifty states and the US holdings. This broad experience enables council staff to recognize patterns in the quality of research designs. The patterns pertain to the good as well as the bad. This paper attempts to identify elements that enhance the quality of research designs, and discuss some of the problems and oversights which should be avoided. Finally, suggestions are offered for promoting favorable reviews.

*Stanish, Charles (Field Museum of Natural History)***[405] TRACK OF THE PUMA: REGIONAL SETTLEMENT AND STATE EXPANSION NORTH OF LAKE TITICACA.**

The expansion of the great Middle Horizon Tiwanaku state (ca AD 600) outside of its core territory remains poorly understood in spite of more than 100 years of research in the region. In a recent intensive, systematic survey in the Juli-Pomata area of the Lake Titicaca region, 39 Tiwanaku sites have been discovered. This paper presents these settlement data and places them in a cultural historical framework. It further assesses their implications for modeling the political and economic processes underlying Tiwanaku state expansion near its core territory.

Stark, Barbara L (see Roler, Kathy) [313]

*Staski, Edward (New Mexico State)***[502] ARCHAEOLOGICAL INVESTIGATIONS AT FORT CUMMINGS, NEW MEXICO.**

In cooperation with the BLM, the archaeology field school of New Mexico State University has involved excavations at Fort Cummings, southwest New Mexico, during the past three summers. The fort was a frontier military outpost (1860s-1890s) principally concerned with the control and ultimate eradication of the Apache. Archaeological research has been focused on the identification of structures and use areas, as well as the investigation of economic and ethnic interactions among military personnel and between the military and surrounding civilian populations. Future fieldwork and research are anticipated.

Steadman, David (New York State Museum), Claudio Cristina (Museo de Isla de Pascua) & Patricia Vargas (Universidad de Chile)

[307] A PRELIMINARY FAUNAL SEQUENCE FOR EASTER ISLAND.

A 1x4 m trench was excavated at the coastal site of Anakena, Easter Island (Rapanui). Six radiocarbon dates are pending. A basal silty clay was overlain by cultural deposits of calcareous sand. Throughout the deposit fish are a more minor component of the vertebrate assemblage than in sites from more tropical parts of Polynesia. Bones of extinct native birds occur in lower strata, while bones of chickens (introduced by Polynesians) increase in upper levels. Rat and porpoise bones occur throughout the sequence. Declines in native birds are part of the overall prehistoric environmental degradation of Easter Island.

Stech, Tamara (Bryn Mawr) [Discussant 708]

Steffen, Anastasia (New Mexico) & Dennis Jones (Louisiana Geological Survey)

[310] MOUND FORM, LOCATION, AND TIME: A RE-EXAMINATION OF CULTURE HISTORY IN THE LOWER MISSISSIPPI VALLEY.

The consideration of prehistoric earthen mounds as archaeological attributes or traits has been fundamental to the construction of culture history in the southeastern United States. Traditional formulations have interwoven interpretations about the relationship of form to function with empirical generalizations concerning the spatial and temporal distributions of mounds. Through a simple statistical analysis of mound inventory data from southern Louisiana, these basic associations between mound shape, location on the landscape, and chronological affiliation are reconsidered. The

results obtained challenge longstanding correlations across these dimensions and suggest that even the most entrenched interpretations of the archaeological record are worthy of re-examination.

*Stein, Gil (Northwestern)***[213] HERDING STRATEGIES AND GROUP MOBILITY IN THE NEAR EAST: ETHNOGRAPHIC AND ARCHAEOLOGICAL PERSPECTIVES.**

Most models of prehistoric Near Eastern herding strategies draw heavily from the ethnographic literature on pastoral nomads. However, the applicability of this analogy is questionable, since virtually all excavated Near Eastern faunal samples derive from sedentary sites. This paper compares caprine production strategies of modern nomadic and sedentary herders. Economic constraints force most sedentary herders to adopt more risk averse, conservative strategies than those of nomads. Analyses of Neolithic and Bronze Age faunal samples from southeast Turkey suggest that this conservative-sedentary production model has widespread applicability for prehistoric village pastoral economies.

*Stephen, David V M & Helen L O'Brien (Pima Community)***[410] MODERN ARCHAEOLOGICAL MAPPING STRATEGIES.**

The latest generation of surveying, video recording, and geophysical equipment has simplified the integration of diverse kinds of field equipment and the data collected in the generation of archaeological maps. Mapping has grown from the production of static hand drafted drawings to the computerized collection of datasets which can be dynamically portrayed through CADD, cartography, and GIS software. Examples are drawn from projects undertaken in Europe, and North and South America, highlighting the use of such equipment in a range of field settings over the past decade.

Steponaitis, Vincas P (North Carolina-Chapel Hill) [Discussant 701]

Steponaitis, Vincas P (see Scarry, C Margaret) [402]

Stevenson, Christopher M (see Lynch, Thomas F) [305]

Stevenson, Joe (Louisiana State)

[310] ZOOARCHAEOLOGY OF THE KLIENPETER SITE, 16EBR5: A PREHISTORIC MOUND COMPLEX IN SOUTHEASTERN LOUISIANA.

I present an overview of the analysis of zooarchaeological remains recovered from a prehistoric mound complex in southeastern Louisiana. Attention is directed toward specialized air injection flotation methods employed during the investigation. This well preserved faunal collection provides one of the few detailed studies of the subsistence systems used by the Plaquemine culture during the Mississippian period.

Stewart, Andrew (see Julig, Patrick J) [710]

Stewart, Richard M (Temple)

[204] COMPARISON OF LATE WOODLAND CULTURES IN THE DELAWARE, SUSQUEHANNA, AND POTOMAC RIVER DRAINAGES, MIDDLE ATLANTIC STATES.

A variety of archaeological cultures, each familiar with maize and other cultigens, are identified for the period [Late Woodland] between AD 900 and 1600 in the three major drainage systems of the Middle Atlantic region. Community patterns vary within and across drainages both synchronically and diachronically, and include everything from dispersed hamlets to large stockaded villages. The importance of agriculture, the environment, and social contexts of the cultures are examined.

Stewart-Abernathy, Leslie C (Arkansas Archaeological Survey)

[104] SEPARATE KITCHENS AND INTIMATE ARCHAEOLOGY: CONSTRUCTING URBAN SLAVERY ON THE ANTEBELLUM COTTON FRONTIER IN WASHINGTON, ARKANSAS.

Historical archaeological investigations of separate kitchen buildings behind houses in the preserved, county seat town of Washington, Arkansas, produced interpretive insights on the construction of landscapes of interaction and control. Kitchens provided both quarters and workspace for African Americans who were slave servants to the white families whose commercial and political ventures supported a newly developing region of cotton planters. The intimate and reflective interaction of slaves and owners in household daily life erased the social and architectural separation between kitchen and main house, and insured ambiguities and syncretism in the habitus built on the Cotton Frontier in the two generations after 1820.

Stiles, Cynthia M (Wisconsin DNR)

[406] AZTALAN STATE PARK IN WISCONSIN: AN ANCIENT SITE WITH A NEW LOOK.

Aztalan is one of the most important sites in Wisconsin, representing a unique expression of Middle Mississippian culture. Despite its importance, the park has received token support from the state's

coffers. In 1989, a legislative task force recommended the development of a plan for the park. Since the summer of 1990, work has emphasized sign and display update, a self-guided tour, landscaping, maintenance, and long-range planning. This Phase I development has been done by the Department of Natural Resources in cooperation with several state agencies, members of the legislature, the statewide archaeological community, and the local historical society.

Stiner, Mary C (New Mexico)

[208] SMALL ANIMAL EXPLOITATION IN THE "MARITIME" PALEOLITHIC OF ITALY.

Remains of marine shellfish, aquatic tortoises, and small terrestrial mammals abound in three coastal caves in Italy, two representing series of Mousterian occupations (Grotta dei Moscerini and G. di S. Agostino at Gaeta) and another representing Mousterian through Mesolithic occupations (Riparo Mochi, Balzi Rossi). As such, the sites provide an unusual opportunity to explore how and to what extent small animals figured in hominid economies from Middle through Upper Paleolithic times on the northern Mediterranean Coast. By examining patterns of damage, this visual presentation addresses [1] how the small animal remains entered the cave deposits, establishing which are truly attributable to hominid activities, and [2] in the case of marine shellfish, possible changes in use as food and the onset and frequency of use as ornaments across the Middle-Upper Paleolithic "transition."

Stone, Connie L (BLM) & Todd Bostwick (Pueblo Grande Museum)

[604] REGIONAL VARIATION IN ARCHAIC SETTLEMENT SYSTEMS AND THE TRANSITION TO FARMING WITHIN THE ARIZONA DESERT.

During the Late Archaic and Early Formative periods in the Arizona desert, regional variation existed in the use of residential areas over time and in the adoption of farming and a sedentary lifeway. Archaic base camp areas in western Arizona were apparently abandoned or converted to different functional roles in subsistence-settlement systems, while a range expansion occurred in much of southern Arizona, where agriculture appears to have been adopted earlier. Differences in ground stone assemblages indicate a varying reliance on cultivated foods at Archaic residential sites in different regions. This paper compares environmental and social factors that structured subsistence-settlement systems and the transition to farming in three desert regions.

Stone, Glenn D (Columbia)

[704] HEDGES, TERRACES, AND WALLS: INTENSIFICATION AND DEMARCATON IN NIGERIA.

Agricultural intensification changes how the farmer relates to the land and also to other farmers; cases from throughout Nigeria show how these changes interact with local ecology to affect the demarcation of agricultural land. In some environments intensification requires landscape modifications which are self-demarcating; elsewhere farmers create boundary features whose permanence reflects the degree of intensification. Also shown are landscapes which favor boundary features even where agriculture is not intensive.

Stone, Tammy (Arizona State)

[304] THE PROCESS OF AGGREGATION IN THE ZUNI REGION: ITS REASONS AND IMPLICATIONS.

The process of aggregation is a complicated one involving regional shifts in settlement pattern from small dispersed communities to large concentrated settlements. This shift results in a reorganization of the social, political, and economic system at both a regional and community level. Five causal models for the initiation of the aggregation process are presented and evaluated for the Zuni region as a whole using large scale survey and excavation data. Implications of this study for the broader question of aggregation in the Southwest as a whole also are discussed.

Storey, Glenn (Penn State)

[311] THE POPULATION OF ANCIENT ROMAN CITIES.

Demographic reconstruction of the ancient Roman cities of Pompeii and Ostia was accomplished by applying hypothetical house-by-house inhabitant counts to the existing remains and Auto-CAD reconstructions of unexcavated areas. The counts were based on demographic parameters gleaned from the Roman ethnohistoric and archaeological records, using cross-cultural preindustrial and modern urban samples as controls. Results suggest typical Roman urban densities between 15,000 and 30,000 persons per square kilometer. The proposed populations of Pompeii and Ostia fall in the lower range of previous estimates, suggesting that the population of Rome was half the one million usually cited.

Storey, Rebecca (Houston)

[505] POVERTY AND DEMOGRAPHY AT TEOTIHUACAN.

Lower-class nonagricultural specialists tended to bear the brunt of the poor health and nutritional conditions of Old World preindustrial cities. Skeletons from a compound in a similar socioeconomic

position at Teotihuacan have evidence of severe health conditions that affected the ability of the city to maintain population. Paleodemographic modeling at the compound reveals that the situation worsened through time. The evidence for the demographic changes and the probable implications for the economic viability of the Middle Horizon city are presented.

Storey, Rebecca (see Lee, Carla) [602]

Stothers, David M (Toledo) & James R Graves (Wisconsin-Madison)

[512] ARCHAEOLOGY, LINGUISTICS, AND ETHNICITY: A CONJUNCTIVE APPROACH.

Based upon correlations in geographic contiguity, ceramic typologies and chronologies, biological and mortuary patterns, and certain settlement pattern aspects, the Western Basin tradition populations who inhabited the lands surrounding the western end of Lake Erie are believed to represent the prehistoric ancestors of another Iroquoian population, who until recent times have not been recognized. It is hypothesized that this hitherto unrecognized member of the Iroquois co-tradition was militarily defeated by encroaching Upper Mississippian Algonquian-speaking Sandusky tradition populations during the 14th century AD, resulting in their withdraw into SW Ontario.

Stratton, Susan K (see Reed, Heidi E) [304]

Straus, Lawrence (New Mexico), Marcel Otte & Jean-Marc Léotard (Liège)

[211] MIDDLE AND EARLY UPPER PALEOLITHIC RESEARCH IN SOUTH-CENTRAL BELGIUM.

Trou Magritte cave has a sequence of Mousterian and Aurignacian levels, the uppermost of which is 14C-dated to 27 kybp. The lithic assemblages include both local and extra-local flints and abundant limestone artifacts. The highly fragmented faunal remains, studied by A. Gautier, include cave bear, wolf, lynx, reindeer, ibex, pika, hare, lemming, other rodents and raptorial birds in the Mousterian, and cave bear, wildcat, lynx, a mustelid, hyena, fox, woolly rhino, reindeer, horse, ibex, a bovine, marmot, and hare in the Aurignacian. Gravettian artifacts were uncovered at the base of loess deposits in the open air site of Huccorgne, which, with a 14C date of 23 kybp, had one of the latest human occupations in north Europe before the Last Glacial Maximum. Distinct activity areas were defined separate debitage and tool scatters, a cluster of bones and stone slabs, and one blade core was refitted. Fauna includes mammoth, horse, hare, bird, and cervid.

Sned, Jalil (Puerto Rico) [Plenary session]

[216] THE COLUMBUS MYTH: THE CARIBBEAN EXPERIENCE.

Sugiyama, Saburo (Arizona State)

[411] WORLDVIEW AND SOCIETY IN TEOTIHUACAN.

Ritual meanings of the principal Teotihuacan pyramids are investigated through contextual interpretations of material culture, using excavations by the author and others at the Quetzalcoatl Pyramid, iconographic studies, and a systematic search for measurement units. These monuments, whose sizes and forms appear to represent the Mesoamerican time-reckoning system, have a powerful and unique time-space symbolism. The associated belief systems may have played important roles in defining the organizational framework and providing specific content meanings for cultural behavior. Discovery of more specific content meanings should lead to more precise understanding of the functional meanings of the city's material culture.

Sullivan, Alan P (Cincinnati)

[703] THEORY, METHOD, AND THE INFERRENTIAL POTENTIAL OF THE ARCHAEOLOGICAL RECORD.

Behavioral archaeology, as a program for archaeological interpretation, suffers from several epistemological difficulties that constrain its advocates in developing convincing, non-trivial inferences about the past. These difficulties are discussed and the outlines of a revisionist behavioral archaeology are presented. Using new archaeological data from the Grand Canyon area, I argue that a reformulation of fundamental premises regarding archaeology, archaeological theory, and archaeological method increases the chances that the "four strategies" will stimulate advances in the conduct of archaeological research and will contribute to new, credible views of the cultural past.

Sullivan, Lauren A (see Driver, W David) [706]

Sullivan, Lynne (New York State Museum)

[615] THE WPA PAYOFF.

The records and collections from many WPA-era projects are literal gold-mines for archaeological data and represent an important example of the need to ensure that archaeological documents are preserved and accessible for future scholars. In areas such as the Tennessee Valley, WPA projects laid the groundwork for regional research, and the collected information often is the only systematic

documentation of major sites that now are inundated and/or destroyed. These irreplaceable records and collections continue to be data sources for many types of research and are used extensively if they are accessible.

Sumner, William M (Chicago)

[609] THE GORDON REGIONAL SURVEY.

The Gordon survey is best described as a full-coverage reconnaissance, designed to explore the complete range of environmental variation in the region and to record all types of archaeological sites. While a more intensive walking survey is needed, some patterns have emerged. Early Bronze Age settlements are small and widely scattered. Regional centers appear in the Middle/Late Bronze Age, but it is not until Phrygian times that an urban population coalesced at Yassihöyük/Gordion, with settled areas spreading around the citadel mound and across the Sakarya River.

Sumner, William M (Chicago) [Discussant 207]

Sundahl, Elaine (see Chase-Dunn, Christopher) [107]

Sutton, George (Cheyenne-Arapaho Business Committee)

[202] WOWISH ATA YA HIYE (REBURIAL).

On a cold morning in November of 1868, General George Custer attacked the village of Black Kettle along the Washita River. Members of the Cheyenne tribe killed at the battle of the Washita (the Black Kettle Massacre) recently were reburied at the Black Kettle National Grassland in Oklahoma. George Sutton of the Cheyenne-Arapaho tribe speaks about his involvement with the reburial of these individuals who until quite recently had been stored in an Oklahoma newspaper office. Mr. Sutton discusses the lessons learned during the reburial process and makes some recommendations for the future.

Swedlund, Alan C (see Nelson, Ben A) [210]

Sweeney, Maria (Hawai'i-Manoa)

[307] EAST POLYNESIAN SUBSISTENCE PATTERNS: A RE-ANALYSIS FROM AN EVOLUTIONARY PERSPECTIVE.

Subsistence patterns offer a perspective on the prehistory of the Marquesas and the Society Islands as Polynesians moved eastwards from west Polynesia. Earlier generalizations argue that first occupation of the islands was associated with broad based patterns of exploitation, while subsequent "adaptation" to the particular environment led to patterns of selective exploitation. After a consideration of the problems in previous quantification, a re-analysis of the evidence indicates that former generalizations cannot be sustained. A different view of first occupation emerges which can be incorporated into an evolutionary framework and discussed in the cultural historical context of the two archipelagos.

Swhart, Sharon (Massachusetts-Amherst)

[605] DISCONTINUITY IN OWASCO-IROQUOIS CERAMIC SERIATIONS: A CHALLENGE TO IN SITU IROQUOIS DEVELOPMENT.

The *in situ* model of Iroquois origins is based largely upon ceramic seriations which assume and seemingly demonstrate that the Iroquois developed sequentially from the Owasco. Niemczycki has found these seriations do not work in western New York state; rather, there, Owasco and Iroquois components overlap. Reevaluation of the stratigraphy on sites in the Upper Delaware River Valley similarly indicates such an overlap, 100-200 years later than in western New York. The archaeological evidence, together with linguistic evidence, suggests a west-to-east Iroquois incursion into an Algonquian-Owasco population.

Szuter, Christine (Arizona) & Frank Bayham (California State-Chico)

[604] LATE ARCHAIC HUNTERS AND FARMERS IN THE AMERICAN SOUTHWEST.

Hunting during the Late Archaic in south-central Arizona was part of a broad subsistence base reflected in the capture of a wide variety of small and large animals. The introduction of ceramics and the establishment of the Hohokam resulted in similar patterns of animal exploitation which were associated with similarities in both social organization and comparable adaptations to a desert habitat. Both occupations involved smaller populations who had less impact on the environment and animal resources. Changes in animal procurement that occurred later resulted from shifts in social organization developing from a greater commitment to agriculture.

Takac, Paul R (Southern Methodist)

[710] SEEING THE FOREST FOR THE TREES? PALEOINDIAN ADAPTATIONS IN AN ECOTONE.

Models of Paleoindian subsistence, mobility, and landscape utilization often have been characterized as either "focal" or "diffuse," frequently depending upon the environmental context in which

they operated—plains/prairie or forest. During the late Pleistocene central Texas was an ecotone separating the grasslands and parklands of west Texas from the pine-dominated forests of the east. Paleoindian subsistence strategies in the area may well have exploited both these resource areas, raising issues regarding their adaptations. The model presented can be evaluated using data from Spring Lake where both underwater and dryland excavations have revealed an extensive occupation by Clovis, Folsom, and later Paleoindian groups.

Tamplin, Morgan (Trent) & James Britton (Sir Sandford Fleming)

[410] AN INTERACTIVE SYSTEM TO MAP SITE DISTRIBUTIONS.

We have developed a system to display distributions of archaeological sites from their location coordinates. Ontario sites yielding bird remains are displayed on a screen or laser-printed. We can show the distribution of any group of sites according to selected spatial, species, and cultural criteria. We discuss the logistic, cartographic, and theoretical issues addressed during the system development and display laser-printed maps to demonstrate the program's capabilities.

Tankersley, Kenneth B (Illinois State Museum)

[710] CLOVIS COLONIZATION PATTERNS IN EASTERN NORTH AMERICA.

This paper examines the Clovis colonization process by identifying patterns in the distribution of stylistically distinct artifacts manufactured from specific lithic material. Colonization is suggested by four patterns: (1) a limited distribution of artifacts; (2) exploitation of a limited number of resources; (3) the occurrence of chipped stone artifacts on sites located great distances from their source areas; and (4) a unidirectional movement of lithic material from west-to-east and from north-to-south. These patterns are not present on post-Clovis Paleoindian sites; they are more dispersed, and illustrate a broader exploitation of resources, and a bidirectional movement of lithic material over smaller areas.

Tankersley, Kenneth B (see Martin, Terrance J) [612]

Tapia, Jorge E (Pittsburgh)

[109] EL NIÑO FLOOD DEPOSITS IN THE LOWER OSMORE DRAINAGE, ILO, PERU.

Records of El Niño events over the past few centuries compared from historical accounts, and recovered from tropical Quelccaya ice cap cores, show long-term changes in the intensity of intertropical circulation across the Pacific Ocean. In fact, records of El Niño events prior to AD 1500 are poorly documented except in ice cores. Having determined two major and four intermediate flood events related with Paleo-ENSO climatological crisis during archaeological times, my purpose is to characterize the extension of each event and search for better potential datable materials which allow us to subscribe these environmental abnormalities to the archaeological account of the southern Peruvian coast.

Taylor, R E (UC-Riverside)

[413] RECENT ADVANCES IN DATING METHODS: HISTORIC PRESERVATION PERSPECTIVE.

The material record of both prehistoric and historic cultures can now be temporally placed using a wide array of analytically based methods developed within the physical and biological sciences. Each method has assumptions and constraints that affect the accuracy and precision of the chronometric data. In addition, the physical or stratigraphic relationship of the substance or object being dated to the cultural expression for which temporal placement is being sought must be explicitly addressed and documented. Using case studies, this paper reviews major advances made over the last decade in developing and improving the capability of various physical dating methods—and particularly the C14 method.

Teltser, Patrice A (Southern Illinois-Carbondale) & Ann F Ramenofsky (New Mexico)

[203] THE MATERIALIST BASIS OF CULTURE HISTORY.

We explore methodological links between construction within an evolutionary archaeology and approaches developed by culture historians through seriation. In both approaches, cultural phylogenies are based on variant frequencies in populations. Time, history, and context are important on an explanatory level. Yet culture history ultimately was grounded in an essentialist metaphysic, and units were perceived as empirical, rather than analytic. Consequently, errors were incorporated into the way knowledge was structured. Because sources of these errors are identifiable, they are predictable and avoidable. Understanding the materialist basis of culture history allows discussion of new analytic units within an evolutionary archaeology.

Teso, Barbara A (see Rathje, William L) [703]

Thacker, Paul (Southern Methodist)

[211] UNDERSTANDING UPPER PALEOLITHIC SITE LOCATION IN PORTUGUESE ESTREMADURA.

The Rio Maior drainage in Portuguese Estremadura contains a large number of late Pleistocene hunter-gatherer occupations. Systematic survey results indicate that these sites are not randomly distributed. Explaining the processes that created intersite patterns must rely on geomorphological reconstruction. Site occurrences appear to correlate with topographic features and resource availability. Upper Paleolithic settlement patterns in the valley system appear to differ from models of contemporaneous land use in southwestern France and Cantabrian Spain. This study illustrates the methodological rigor necessary for any credible settlement system model for the Upper Paleolithic.

Thomas, David Hurst (American Museum of Natural History)

[601] THE IMPACT OF EUROPEAN CONTACT ON NATIVE AMERICANS.

This presentation highlights current thinking about the Hispanic-Native American interactions, particularly from perspectives afforded by the on-going Columbian Quincentenary. Historical and archaeological data strongly suggest that, contrary to views long held by American historians, Indians were never merely passive recipients of whatever new practices the Spanish chose to introduce. Rather, American Indians more creatively adopted and manipulated those traits that proved relevant, and simply ignored many others. Far from being luckless puppets, Native Americans commonly attempted to manipulate the rapidly changing conditions to their own advantage, insofar as that was possible. The cultural instability of the times actually provided opportunity for many Indians, both promoters and adversaries of the Spanish regime.

Thomas, David Hurst (American Museum of Natural History) [Discussant 1]

Thomas, David Hurst (American Museum of Natural History) [Discussant 102]

Thomas, David Hurst (see Wylie, Alison) [Plenary session 216]

Thoms, Alston (Texas A & M)

[710] LAND USE DIVERSITY ON A SUBTROPICAL RIVERINE LANDSCAPE: TERMINAL PLEISTOCENE AND HOLOCENE ARCHAEOLOGY, LOWER MEDINA RIVER VALLEY, SOUTH TEXAS.

Archaeological assemblage diversity is evident at 41BX831, where five well-dated components spanning the last 10,500 years are buried in 10.5 m of stratified alluvium. Available data fail to evidence a similar magnitude of local paleoenvironmental diversity. Sample size and preservation conditions do not appear to account for the observed assemblage diversity and inferred changes in local land use. Places where resource availability remained fairly constant are important for the study of non-environmental variables in the process of land use change, such as the role of population dynamics.

Thornberry, Jacquie (see Dirkmaat, Dennis) [509]

Tipps, Julie & Ron King (Nevada-Reno)

[410] TRAMPLING THE ARCHAEOLOGICAL RECORD.

Recent research by the University of Nevada at Reno in eastern Nevada and southern Africa explored the effects of cultural and non-cultural trampling and scruffage. Using recent experimental and theoretical evidence from various sources, we offer interpretations of central Great Basin ceramic and lithic features subjected to prehistoric cultural transformations and historic non-cultural treadage by cattle. These results are compared to ceramic assemblages from Zimbabwe subjected to large game trampling.

Tirrell, Peter (Oklahoma Museum of Natural History)

[406] TRAVELING EXHIBITS GIVE NEW INTERPRETATION TO OLD STORIES.

The presentation focuses on the successful use of traveling exhibits at archaeological parks, interpretive centers, and museums to increase visitor awareness, appreciation, understanding, and commitment to archaeological resources. The exhibit "Spiro Mounds: Prehistoric Gateway, Present-Day Enigma" is used as a case study. The exhibit represents a cooperative effort of the Oklahoma Museum of Natural History, the Oklahoma Archaeological Survey, and other local, state, and federal agencies and institutions. Discussion includes sensitivity to Native American issues regarding the design, educational activities at host sites, evaluation, and potential for future use of exhibits and accompanying interpretive materials.

Tisdale, Mary (see Brook, Richard) [112]

Tooker, Elisabeth J (Temple) [Discussant 605]

Toumazou, Michael K (Davidson), Richard W Yerkes (Ohio State) & P Nick Kardulias (Kenyon)

[311] ATHENOU ARCHAEOLOGICAL PROJECT, 1991: THE SECOND SEASON AT ATHENOU-MALLOURA, CYPRUS.

Michael Toumazou directed the 1991 investigations at Athenou-Malloura, Cyprus. Excavations and surface collections at the Byzantine/Frankish settlement defined its spatial and chronological boundaries. Excavations at a rural Archaic-Hellenistic sanctuary west of the Byzantine/Frankish settlement exposed statuary fragments and provided information on its use and abandonment. A systematic survey of a 20 km² area around Malloura documented landuse from Neolithic times up to the present. Thirteen sites were located, dating from aceramic Neolithic to Turkish periods. Special efforts were made to locate and map the hundreds of looted tombs in the Malloura Valley, and to try and learn more about their age and character.

Towner, Ronald H (Arizona)

[502] DATING THE DINETAH PUEBLITOS: THE TREE RING DATA.

The pueblos of Dinetah have played an important role in the interpretation of post-Pueblo revolt population dynamics in northwestern New Mexico. Various aspects of Navajo culture have been attributed to an influx of Puebloan refugees after the reconquest. Detailed analysis of previously collected and newly acquired tree ring dates from the pueblito sites indicates that this model may need modification. The temporal distribution of cutting dates and construction episodes demonstrates that the majority of activity at the sites occurred much later. Explanations for this distribution and suggestions concerning the population dynamics of the area are presented.

Towner, Ronald H (see Altschul, Jeffrey H) [701]

Traxler, Loa (Pennsylvania)

[209] EVOLUTION OF MONUMENTAL COURTS AT THE COPAN ACROPOLIS.

Interpreting the social statement of polity center architecture opens a window to the organization and history of the society responsible for its construction. The form, function, and organization of the monumental court architecture in the Acropolis of the Classic Maya site of Copan, Honduras, is examined through a unique program of tunneling, surface excavation, and computer assisted architectural recording. Over 400 years of architectural expression is investigated to comprehend the evolution of the Acropolis and its role in the Copan polity. This research follows the architectural transformation of this polity center during the period of Copan's increasing sociopolitical complexity, culminating in its state-level hegemony within the region.

Trierweiler, W Nicholas (see Hill, James N) [603]

Tucker, Amy (see Nielsen, Axel E) [309]

Tucker, David B (Colorado-Boulder)

[105] STRUCTURE FUNCTION INTERPRETATION AND ETHNOGRAPHIC ANALOGY: ENIGMATIC STRUCTURES AT CERÉN.

Based on artifactual and architectural contents, many structures at Cerén are securely identified as domiciles and storage structures. However, functions of five structures are somewhat problematic for several reasons: absence of artifactual clues, incomplete excavation, or unique form. To make functional identifications, other lines of evidence must be explored. While studies of form and container theory offer intriguing avenues of inquiry, ethnographic analogy addresses the problems within a similar contextual framework. Nevertheless, ethnographic analogy can only provide plausible suggestions about function. A method for testing interpretations in the field must be developed.

Tucker, David B (see Spetzler, Hartmut A W) [105]

Turross, Noreen (Smithsonian) & Tom D Dillehay (Kentucky)

[212] MOLECULAR PRESERVATION AT MONTE VERDE.

Monte Verde is a late Pleistocene human habitation site in southern Chile. Biochemical investigations into the preservation at Monte Verde have documented nearly contemporary levels of molecular integrity in many cases. A basic understanding of why Monte Verde persisted for 12-18,000 years is evident at both the molecular and atomic level within the context of an unusual geological setting. The preserved biomolecules are used to identify morphologically nondescript soil clusters as containing skin and bone, and are further used in an analysis of blood residues on the edges of a subset of the stone tools.

Turner, Christy G II (see Rice, Glen E) [701]

Turpin, Solveig A (Texas-Austin)

[303] THE WERE-COUGLAR THEME IN LOWER PECOS ART: OR WHERE PEOPLE WENT AND WHAT THEY THOUGHT ABOUT IN PREHISTORY.

The were-cougar theme is but one of the iconographic conventions that points to a shamanic context for the Archaic-age rock art of the lower Pecos River and middle Rio Grande. The extent of

this unified belief system can now be extended 90 miles into Mexico, where rock art sites belonging to this religious tradition demonstrate the movement of people and ideas across the Rio Grande and around or through the mountainous areas of northern Coahuila. The almost archetypal view of arid lands adaptation in this region must be revised to accommodate exploitation of this montane habitat.

Tykot, Robert (Harvard)

[108] REGIONAL INTERACTION IN THE PREHISTORIC CENTRAL MEDITERRANEAN: CHRONOLOGICAL VARIATION AS EVIDENCED BY OBSIDIAN EXCHANGE.

Chronological change in the distribution of characteristic ceramics and raw materials such as flint and obsidian emphasize the dynamic nature of regional interaction in the prehistoric central Mediterranean. The "trade" in obsidian, for example, suggests the parallel movement of untraceable or perishable goods (e.g., salt, animal products), and may be a directional indicator for the introduction of domesticated plants and animals in the Neolithic. The distribution patterns themselves infer the use of particular exchange mechanisms, and reflect chronological developments in settlement pattern and social organization.

Umlauf, Marcelle (see Pearsall, Deborah M) [501]

Upsham, Steadman (see Nicholas, Linda M) [107]

Urban, Patricia A (see Schortman, Edward) [206]

Valdez, Fred Jr (Texas-Austin)

[706] LATE PRECLASSIC ARCHITECTURE AND RITUAL AT RIO AZUL, PETEN, GUATEMALA.

A Late Preclassic structure at Rio Azul is described. Ritual activity associated with the building is presented and interpretations posited. Comparative information to similar constructions and activities at other Lowland Maya sites also is presented.

Valla, François (CNRS)

[506] SEASONALITY IN THE NATUFIAN OF THE LEVANT.

The Natufian culture exhibits a tendency to sedentism ca 12,500 years ago in the most favored areas of the Mediterranean belt in the Levant. In more arid places—the Judean Desert, the Negev, and the like—this way of life was most probably untenable, and smaller sites are indicative of various levels of mobility. A few models have been suggested in the past to explain the relationship between the major sites and the smaller ones. In this view, it is of major importance to trace any indication of seasonality. Unfortunately the data are still scant and equivocal.

Van Tilburg, JoAnne (UCLA)

[301] EASTER ISLAND'S PREHISTORY: IN THE WAKE OF THE KON-TIKI.

The prehistoric landscape of Easter Island is justly famous for its plethora of monolithic sculpture and abundance of archaeological remains. Nearly 100 years of archaeological and anthropological investigations by scholars from several countries, culminating in the systematic archaeological survey of the island, have yielded data describing a rich and varied East Polynesian culture. In spite of this, in the minds of the public, Easter Island remains "mysterious" and "enigmatic." This paper explores the social and economic investment the people of the island have had in pseudoscience, and confronts the issues of responsible public education and communicative scholarship "in the wake of the Kon-Tiki."

Vandiver, Pamela (Smithsonian)

[511] A REGIONAL PERSPECTIVE ON THE MESOLITHIC DEVELOPMENT OF POTTERY PRODUCTION IN EAST ASIA.

Recent excavation of pottery fragments at Mesolithic sites in the Soviet Far East, China, and Japan has led to technical study of the methods of construction and raw materials selection. We examine the continuity and change in ceramic production from east Asian Upper Paleolithic sites which are few in number, as well as from the many Mesolithic sites at which similarities in methods and sequences of pottery construction, but not raw materials, have been demonstrated.

Vargas, Patricia (see Steadman, David) [307]

Veintimilla, Cesar & Deborah M Pearsall (Missouri-Columbia)

[501] A PRELIMINARY ANALYSIS OF PAST VEGETATION IN THE JAMA RIVER VALLEY, MANABI PROVINCE, ECUADOR.

This paper reports on our on-going research in past vegetation patterns in the Jama River Valley of western Ecuador. New diagnostic phytoliths isolated from some tropical dicotyledons native to the dry forest of western Ecuador have been identified. These are described, and their value in identifying

phytoliths extracted from geological soils in the valley are discussed. The application of the phytolith technique in vegetation reconstruction, as well as change of vegetation through time, are reported using core samples taken from the valley.

Versaggi, Nina M (SUNY-Binghamton) & Todd A Koetje (Indiana-Pennsylvania)

[509] THE JENSEN-BLACK CREEK SITE: INTRA-SITE PATTERNING AT A LAMOKA OCCUPATION.

The late Archaic Jensen-Black Creek site in southwestern New York reveals clear activity-specific intra-site patterning. Spatial analyses, including K-means clustering, artifact diversity tests, and SURFER maps, distinguished the following three zones: a possible structure with postmolds, functional features (storage and roasting pits), and peripheral artifact scatters. Radiocarbon dates (2500-2100 BC) link the two feature zones but suggest possible multiple occupations of the site. Results contribute important evidence on intra-site patterning for Lamoka sites in the Upper Genesee drainage basin. These data also fine-tune interpretations of hunter-gatherer organization and land use in the Northeast.

Versaggi, Nina M (SUNY-Binghamton) [Discussant 705]

Versteeg, Aad H (Rijksuniversiteit Leiden) & Samuel M Wilson (Texas-Austin)

[503] INTER-AND INTRA-SITE SETTLEMENT PATTERNING ON NEVIS, ST KITTS, AND ST EUSTATIUS.

Along the volcanic arc of the Leeward Islands of the Lesser Antilles, recent archaeological survey has provided regional settlement pattern data on more than 50 previously unknown prehistoric sites. Large-scale horizontal excavations at the Golden Rock and Smoke Alley sites on St Eustatius have produced detailed information on their organization and internal structure. This paper combines regional information concerning the number, size, and location of settlements with the unique information on site structure provided by the St Eustatius excavations.

Wetter, John F (USEPA)

[502] EPA'S SUPERFUND ARCHAEOLOGY PROGRAM.

The Environmental Protection Agency's Superfund Program has spawned a massive effort of data collection and analysis at specific National Priority List contaminated sites. This effort is designed to both restrict the public's contact with hazardous materials and to enable the return of contaminated lands to useful purposes. The agency's NHPA Section 106 compliance activities have required the detailed evaluation of many of these same lands. The results of this work have added significantly to our understanding of past cultural processes at a number of these sites. Additionally, the analysis of the historic vectors of contamination has been useful to the understanding of the contemporary problems of clean up.

Vierra, Bradley J (New Mexico)

[511] EVALUATING HUNTING TACTICS VERSUS SUBSISTENCE DIVERSIFICATION EXPLANATIONS FOR LONG-TERM CHANGES IN MESOLITHIC TECHNOLOGY.

This paper evaluates opposing hypotheses which attempt to explain changes in Mesolithic technology. The "hunting tactics" explanation states that the shift from non-geometric to geometric technologies is the result of a switch from the intercept hunting of migratory game to the encounter hunting of non-migratory game. Whereas, the "subsistence diversification" explanation states that these changes are related to the increasing exploitation of a variety of terrestrial and aquatic resources by specialized task groups. The empirical implications of these hypotheses are reviewed for northern Spain and Portugal.

Voigt, Mary M (William & Mary)

[509] GORDION EXCAVATIONS 1988-1989: GOALS, STRATIGRAPHY, AND ARCHITECTURE.

Texts provide some fixed points in the history of Gordian, but much information on the nature and duration of archaeologically defined periods and of transitions between them is provided by new stratigraphic data. Stratigraphy coupled with information on architecture and domestic features contribute specifically to our understanding of: 1) events during the "Dark Age" that followed the collapse of the Hittite empire; 2) political implications of the rebuilding that followed the 700 BC destruction; and 3) economic consequences of the fall of the Phrygian state to the Persians c. 500 BC.

Voorhies, Barbara (UC-Santa Barbara) [Discussant 306]

Wailes, Bernard (Pennsylvania)

[408] SETTLEMENT IN IRELAND: A STUDY OF CONTRAST.

Settlement data are extremely sparse for Bronze and Iron Age Ireland, but abundant for the early Medieval period. A variety of environmental, economic, sociopolitical, and ideological factors might

be involved in this contrast, so might differential preservation, so might the perceptions of historians and archaeologists. Examination of these variables leads to a proposition that the contrast may be more apparent than real.

Walker, Debra S (Minnesota) & Robin Robertson (Emma Willard)

[706] SMASHED POTS AND SHATTERED DREAMS: MATERIAL EVIDENCE FOR AN EARLY CLASSIC SITE TERMINATION AT CERROS, BELIZE.

A remarkable deposit atop Cerros Structure 4 comprises evidence for exceptional ritual activity. Larger in scale than its Late Preclassic antecedents, this deposit of partly reconstructable vessels reflects ritual performance at a grand scale. Dated to the site's Early Classic collapse, increasing stress from population loss may have prompted its performance. That participants used the same format as their ancestors to re invoke ancient power reflects tension inherent in the declining center. Ironically, the ensuing demise of Cerros transformed the site-focused dedication ritual into a site-centered termination ritual.

Walker, William H (Arizona)

[703] CEREMONIAL TRASH: A STUDY OF RELIGIOUS ARCHAEOLOGY.

Previous studies of prehistoric religion have minimized the reconstruction of religious behaviors and emphasized the ideological component of prehistoric religion. These studies have been composed of abstract symbolic analyses of motifs and icons and retrospective functional analyses of the integrative power of religion. This paper proposes a behavioral category, ceremonial trash, to understand a significant part of the archaeological record of prehistoric religion. It is argued that behavior provides a useful point of departure for the construction of the prehistory of religions.

Walker, William H (see Nielsen, Axel E) [703]

Wallace, Henry D, James M Heidke & Lyn Johnson (Desert Archaeology)

[410] REFUSE CLASSIFICATION AND RECOVERY EFFICIENCY AT LARGE CERAMIC PERIOD OCCUPATIONS IN CENTRAL ARIZONA.

Formation process studies are usually conducted after an excavation's completion, rather than during its testing phase. We present a sampling method that classifies the integrity and usefulness of archaeological deposits. The procedure incorporates field data with laboratory analyses in a rapid computerized evaluation that is available for structuring subsequent sampling decisions during field work. This allows the efficient allocation of resources and levels of effort relative to the study's research issues and the realities of the archaeological record. The method is illustrated with data from the large-scale excavations of a series of central Arizona pithouse and pueblo sites.

Wallace, Henry D (see Doelle, William H) [701]

Wandsnider, LuAnn (Nebraska-Lincoln) [Workshop 401]

Warburton, Miranda (Navajo Nation Archaeology)

[514] A RE-EVALUATION OF THE PREHISTORY OF THE HOPI BUTTES DISTRICT, ARIZONA.

Hopi Buttes District archaeology has long been underrepresented in discussions of Southwest prehistory. The Hopi Buttes area is intriguing because it is a transitional region between the Little Colorado and Tusayan districts. Two recent powerline surveys, conducted by NNAD-NAU, led to the recording of 50 archaeological sites that provide important insights into Pueblo period settlement in this area. Basketmaker III through early Pueblo IV period sites were recorded, and results of this work are summarized. Of particular interest are a number of PIII-IV transitional sites—a period critical to our understanding of PIV aggregations, and about which little is known.

Ward, H Trawick (North Carolina-Chapel Hill)

[102] TRIBES AND TRADERS: CONTACT AND CHANGE ON THE NORTH CAROLINA PIEDMONT.

Numerous small tribes dotted the North Carolina piedmont when the first Europeans arrived. Because of their size or location, these "Siouan-speaking" groups avoided the first waves of disease and disruption ushered in by the 16th century Spanish. With the establishment of English settlements and the development of a lively peltry trade, during the last half of the 17th century, the piedmont tribes soon felt the sting of disease, depopulation, and social upheaval. Yet in spite of massive devastation and disruption, many native traditions persisted unchanged until the region was abandoned during the early 18th century.

Ward, Jerome V (see Athens, J Stephen) [307]

Warner, Mark (Virginia)

[606] AFRICAN AMERICANS IN 19TH CENTURY ANNAPOLIS: MATERIAL CONSUMPTION AND THE NEGOTIATION OF IDENTITIES.

For three hundred years African Americans have been a recognized and critical part of the economy of the Chesapeake. Less clear, however, are the social relationships which were negotiated by African Americans. This paper addresses African American social and economic identity in 19th-century Annapolis. Using materials from recent excavations, it is argued that the economic integration of the African American community in Annapolis did not necessarily reflect a similar degree of social integration. Although African Americans were active participants in the local economy, the consumption choices they made served to maintain an identity apart from their white counterparts.

Waselkov, Gregory A (South Alabama)

[402] CHANGING STRATEGIES OF INDIAN FIELD LOCATION IN THE EARLY HISTORIC SOUTHEAST.

During the historic period (from the mid-16th to early 19th centuries) in southeastern North America, Indian agricultural methods changed as native societies adapted to new epidemiological, demographic, political, and ethnic conditions. One aspect of agriculture, the strategies employed in selecting field locations, can be studied by recourse to historical and archaeological evidence. A labor-intensive, mixed-habitat strategy that combined large, contiguous fields in floodplain bottomlands with upland fields gradually gave way everywhere (though at different times across the region) to small, isolated fields, primarily on upland soils.

Waselkov, Gregory A (see Potter, Stephen R) [606]

Watson, Patty Jo (Washington-St Louis)

[402] THE SHAPING OF MODERN PALEOETHNOBOTANY.

Richard A Yarnell is one of the most productive scholars in contemporary paleoethnobotany, and he is also one of the major founding figures of the subdiscipline. For this presentation, I emphasize his role in the professionalization of archaeobotanical and paleoethnobotanical research, as well as his own broadly based contributions to the paleoethnobotany of North America.

Watson, Patty Jo (Washington-St Louis) [Discussant 304]

Watters, David R (Carnegie Museum of Natural History) & James B Petersen (Maine-Farmington)

[503] INTER-ISLAND SETTLEMENT PATTERN VARIABILITY IN POST-SALADOID BARBUDA AND MONTSERRAT, NORTHERN LESSER ANTILLES.

Barbuda and Montserrat, carbonate and volcanic islands respectively, provide a basis of comparison, derived from ceramic forms and radiocarbon dates, for the late Ceramic Age settlement patterns. Substantial occupation of Barbuda occurred in the post-Saladoid period after AD 600, whereas Montserrat was inhabited for a longer time, during the Saladoid and post-Saladoid periods. Post-Saladoid sites are greater in number, smaller in area, and occupy a variety of environmental settings. Aspects of subsistence diversification, population pressure, and social evolution, among other factors, were likely responsible for these developments.

Wayman, Michael L (see Ehrenreich, Robert M) [708]

Webb, Thompson III (see Newby, Paige) [614]

Weber, Andrzej (Alberta)

[312] NEOLITHIC SEAL HUNTING ON THE LAKE BAIKAL: PRELIMINARY REPORT ON THE THIN SECTIONS OF THE SEAL CANINES.

The oldest archaeological evidence of seal hunting on the Baikal Lake, USSR, has been dated to around 8000-7000 BP. As part of a major research program on early Holocene subsistence patterns in the region of the Baikal Lake and Angara River, a total of 30 specimens of seal canines have been brought to Edmonton for thin sectioning. The analysis of annual growth rings provide information on some aspects of seal hunting in the area.

Webster, David (Penn State)

[602] SHERDS AND STONE: DATING THE COPAN CERAMIC SEQUENCE.

Ceramic sequences have traditionally been constructed by archaeologists on the basis of stratigraphic relationships, seriation, cross-dating, and when possible, association with dated monuments. Chronometric dates are used to anchor sequences, but are usually too few to provide detailed tests of the accuracy of ceramic phasing. At Copan, Honduras, an abundance of obsidian dates allows us to test the accuracy of an independently constructed ceramic sequence. Ceramic assemblages from eight

excavated rural sites are examined with regard to the Middle Classic-Late Classic ceramic transition at Copan.

Webster, Laurie D (see Hays, Kelley Ann) [205]

Weiss, Harvey (Yale)

[207] TELL LEILAN AND THIRD MILLENNIUM SECONDARY STATE FORMATION.

Excavations at Tell Leilan, NE Syria, provide unique chronological refinement for the secondary state formation process in northern Mesopotamia. The process is now evident within large-scale exposures of public and domestic quarters as well as Leilan region settlement change. The rate of change distinguishes this process from primary state formation. Synchronous secondary state formation from Ebla to the Indus and the adoption of southern Mesopotamian administrative iconography to legitimize new political structures suggest that ED III Sumer was responsible for these developments.

Weitzel, Timothy (Iowa)

[607] WEAVER CERAMICS FROM THE GAST FARM SITE (13LA12), SOUTHEASTERN IOWA.

Ceramic evidence from 1990-1991 controlled surface collections and excavations shows that the western part of the Gast Farm site consists of a Late Woodland Weaver "phase" village. Gast Farm has produced the largest sample of Weaver artifacts west of the Mississippi River, and these Late Woodland ceramics may define a separate cultural entity within the Weaver complex. This paper defines those attributes which characterize Weaver ceramics in Iowa and draws comparisons with Weaver ceramic assemblages from several sites in Illinois.

Welch, John R (Arizona)

[701] ETHNOGRAPHIC AND ETHNOHISTORIC AGROECOLOGY: CAUTIONARY TALES OR INTERPRETIVE FOUNDATIONS?

Archaeologists' interpretations of settlement and organizational dynamics in farming societies increasingly rely on estimates of acreage devoted to food production and yields. These estimates are notoriously tenuous, however, and we confront once again the challenges inherent in reconstructing living systems from elusive and fragmentary material remains. This paper examines documentary evidence for Tonto Basin farming to highlight the opportunities and constraints that shaped the region's ancient agroecology. The data have implications for current views on the basin's Preclassic-Classic transition and its capacity for surpluses sufficient to support large populations or to fuel centrally administered redistribution networks.

Wells, Peter S (Minnesota)

[408] SETTLEMENT DISCONTINUITIES AND THE END OF THE EUROPEAN IRON AGE.

Settlements called *oppida* represent the culmination of Iron Age economic and social systems in temperate Europe. Caesar's descriptions of Gaul have served as models for archaeological study in central and eastern Europe as well as in France, and the Roman conquest of central Europe has been connected with the end of *oppida* there. New studies of chronology and spatial patterning suggest instead that military confrontations, abandonments, and resettlements occurred before invading armies arrived. Analyses at Manching, Kelheim, and Staré Hradisko show that discontinuities in settlement resulted from changes in native social and political systems.

Wenke, Robert J (Washington)

[308] OLD KINGDOM EGYPT: THE VIEW FROM THE DELTA.

Recent excavations of Old Kingdom sites in the Egyptian Delta are reviewed in the context of contemporary models of early Egyptian cultural evolution. The apparent shift of Egypt's developmental focus from Upper to Lower Egypt during the later Old Kingdom is considered in relation to demographic and administrative factors, and to cultural interactions with Southwest Asia.

Wesler, Kit W (Murray State)

[406] THE WICKLIFFE MOUNDS CEMETERY: EDUCATING THE PUBLIC IN A CHANGING EXHIBIT.

The Wickliffe Mounds cemetery was first excavated and opened to the public in 1932. In 1991, the Wickliffe Mounds Research Center began removing the human skeletal remains from display and preparing a new exhibit for the same space. The entire process is open to public view, allowing firsthand observation and free discussion of the procedures and problems. Public reaction among the site visitors and the regional population has been guardedly favorable. The new exhibit will include expanded textual, graphic, and audiotape discussions of the burial and looting issue, and the value of archaeological research in cemetery sites.

West, Jolee (Illinois-Urbana-Champaign)

[215] HUMAN UTILIZATION OF AQUATIC REPTILES IN EAST TURKANA, KENYA.

Human utilization of crocodiles and turtles was investigated through analysis of remains from modern human occupation sites found along the eastern shores of Lake Turkana, Kenya. Prey size,

element representation, and damage patterning were examined and together provide a baseline model for hominid utilization of these taxa. Comparison is made to the reptilian components of several East African Pleistocene and Holocene archaeological faunal assemblages.

Wetterstrom, Wilma (Harvard)

[207] DIET AND COOKING IN A WORKMEN'S QUARTER IN THE 3RD MILLENNIUM BC AT TELL LEILAN.

The 1989 excavations at Tell Leilan exposed a large area of a workmen's quarter, which allowed us to sample extensively for plant remains in a variety of closely controlled domestic contexts—floors, hearths, ovens, and courtyards. The materials, recovered by flotation, reflected household food processing activities and diet. Cereals—emmer, durum wheat, and barley—apparently were delivered to households cleaned, presumably as rations, as only the final stages of cereal preparation were revealed in the samples. The other staple was lentil, an important rotation crop. Dung fuel apparently was used for cooking as there was little charcoal.

Wetterstrom, Wilma (Harvard)

[308] OLD KINGDOM ECONOMIES AS REFLECTED IN BOTANICAL REMAINS.

The analysis of botanical remains recovered from systematically collected samples at the Old Kingdom sites of Giza and Kom el-Hisn allows the reconstruction of economic pathways between the agriculturally important areas of the Nile Delta and the administrative and mortuary complexes in the core of Old Kingdom Egypt.

Whalen, Michael E (Tulsa)

[304] LATE ARCHAIC AND EARLY CERAMIC ADAPTATIONS TO THE DESERT MOGOLLON REGION.

The Desert Mogollon Archaic adaptation is argued to have focused on large winter base camps which were provisioned from small, scattered warm-season procurement sites. Ethnographic data from the Great Basin Shoshoni and Paiute are used to model this adaptation. The same seasonal mobility pattern continued into Early Ceramic times, but new excavation data show that important modifications were made. Chief among these are longer stays at winter base camps, supported by increasingly elaborate and intensive winter provisioning strategies. This is a logical precursor to the sedentary adaptation used by Late Ceramic (Pueblo) groups in the Desert Mogollon region.

Whalen, Norman (Southwest Texas State) & David W Pease (Southern Methodist)

[313] LOWER AND MIDDLE PLEISTOCENE SITES IN ARABIA.

As a consequence of systematic archaeological surveys during the past several years, the Arabian Peninsula has yielded many sites of Middle Pleistocene and some of Lower Pleistocene age. The oldest of these sites relate to the earliest human migration out of Africa into other continents of the Old World. Recent investigation in Arabia in 1991 has uncovered additional sites that confirm the antiquity of early human radiation into western Asia during the Lower Pleistocene.

Whelan, Mary K, Margo Neverett (Iowa) & Kristin D Sobolik (Southern Illinois-Carbondale)

[607] THE GAST FARM SITE FAUNAL REMAINS: MIDDLE AND LATE WOODLAND SUBSISTENCE PATTERNS IN SOUTHEASTERN IOWA.

This paper presents the preliminary faunal analysis from the Middle and Late Woodland components at the Gast Farm site. Organic preservation was good throughout the site, but most complete at the Late Woodland locus, with fewer organic remains associated with the Early and Middle Woodland occupations. Over 4000 faunal remains were recovered, primarily from pit features and midden deposits. The Late Woodland locus also yielded carnivore coprolites. The quantity and diversity of the faunal material is indicative of sedentary occupations with intensive exploitation of local food resources, especially fish, turtles, waterfowl, deer, and elk.

Whelan, Mary K (see Baker, Richard G) [607]

White, Joyce (Pennsylvania)

[507] PREHISTORIC ROOTS FOR HIERARCHY IN EARLY SOUTHEAST ASIAN STATES.

The unstable nature and prolonged developmental chronology of Southeast Asian state formation have been considered anomalous when viewed through explanatory models emphasizing stage development of political hierarchies. This paper proposes that the development of early Southeast Asian states represents an outstanding example of hierarchical process and trajectory. Prehistoric archaeology predominantly in Thailand is revealing the roots of a flexible hierarchical structure in craft production and agricultural organization.

White, Randall (New York)

[608] THE CONSTRUCTION OF SOCIAL IDENTITY IN THE EUROPEAN AURIGNACIAN:
FROM THEORY TO PRAXIS.

The study of Paleolithic personal adornment has much to contribute to our understanding of social evolution, when viewed as a means of constructing social identity. A broad view of the operational sequence for body ornaments is mandatory and must take into consideration cosmology, raw materials, production techniques, labor input, and socially variable contexts of procurement, production, use, and loss/abandonment. On-going microscopic and experimental research on a large sample of Aurignacian body ornaments sheds surprising light on the material construction of social identity near the origins of durable body ornaments.

Whitehouse, Ruth (London)

[108] GENDER CONSTRUCTION AND GENDER ROLES IN A PREHISTORIC SOCIETY: A
CASE STUDY FROM SOUTHERN ITALY.

The paper addresses gender construction and gender roles in some south Italian communities of the later Neolithic and Copper Age. The evidence comes from hidden 'underground' ritual sites including both natural caves and crevices, and artificial rock cut tombs and hypogea. They seem to have been used for a range of ritual activities, including burial and other rites of passage, perhaps including initiation rites into a secret cult society. It is argued that membership was restricted to males, who wielded power over women through exclusive control of secret ritual (cosmological) knowledge.

Whitley, David S (W & S Consultants)

[303] ETHNOGRAPHY AND ROCK ART IN THE FAR WEST.

Encouraged by recent dating research, a systematic re-examination of California, Great Basin, and Plateau ethnographies reveals a rich record of information about the art. This supports only two origins for it: puberty initiation rites and shamanistic practices, both of which concerned vision questing to obtain spirit helpers. The archaeological implications of this evidence are considered in reference to a neuropsychological model of ASC graphic imagery, rock art styles, the use of style to define ethnolinguistic groups, and the management of rock art sites.

Whitridge, Peter (Arizona State)

[312] AN ETHNOARCHAEOLOGICAL STUDY OF SEAL BUTCHERY AND TRANSPORT BY
CLYDE RIVER INUIT.

In spite of some forty years' attention to butchery studies, and investigations of the economic anatomy of prey species ranging from kangaroos to penguins, no useful butchery data have been reported for seals. In an effort to define criteria for interpreting the large, well-preserved Pinniped assemblages from Thule Eskimo sites in the central Canadian Arctic, an ethnoarchaeological study was conducted of late winter breathing-hole sealing by Inuit hunters on Baffin Island. In conjunction with experimental studies of seal economic anatomy, and ethnographic evidence for the existence of seal-sharing partnerships, this avenue of research could lead to the recognition of socially prescribed redistribution in the archaeological record of egalitarian hunter-gatherers.

Whittington, Stephen (Maine)

[602] THE PALEOEPIDEMIOLOGY OF COPAN'S LOW STATUS POPULATION.

A paleoepidemiological approach to analyzing skeletons of low socioeconomic status individuals from Copan involved consideration of reconstructions of prehispanic Maya culture, historical accounts of disease in the Maya area, the distribution of pathological changes within each skeleton, and the distribution of disease within the population. Heterogeneity was controlled by dividing the population into subpopulations based on sex, phase, site type, and site location. Application of the statistical techniques of survival analysis and log-linear modeling to subpopulation data revealed where significant differences existed in demography, disease, and evidence of stress. Results contribute to interpretation of Copan's population growth and decline.

Whittlesey, Stephanie M (Statistical Research)

[701] ETHNICITY AND COMPLEXITY: ARCHAEOLOGICAL PERCEPTIONS.

Concepts of ethnicity or cultural affiliation are linked with archaeological perceptions of sociopolitical complexity in the Tonto Basin in incompletely understood ways. The region has been characterized incomparably both as a "melting pot," where indigenous people and immigrant groups resided together, and as a unified expression of a single culture, such as Hohokam. These perspectives influence perceptions of complexity. For example, archaeologists viewing the Tonto Basin as Hohokam from the Gila-Salt Basin perceive complicated sociopolitical development. In this paper, the

forcing effects of archaeological perspectives on ethnicity and complexity are discussed from theoretical and practical standpoints.

Whittlesey, Stephanie M (Statistical Research) [Discussant 106]

Whyte, Thomas R (see Kimball, Larry R) [310]

Wicker, Nancy (Mankato State)

[311] ENGENDERING VIKING ARCHAEOLOGY: THE UNDERREPRESENTATION OF WOMEN
IN MORTUARY EVIDENCE.

This paper investigates whether archaeological underrepresentation of women in Scandinavian Viking period mortuary evidence may be related to literary and historical evidence. The dearth of women as determined by archaeological methods may be due to a less ostentatious burial rite for women, methods biased toward locating male remains, or an actual outnumbering of women by men. Old Norse sources mention fewer females than should occur according to natural sex ratios and refer to the exposure of female infants. The scarcity of women in graves may result from preferential female infanticide compounded by relative invisibility of low status female graves.

Wickler, Stephen (Hawai'i)

[307] METHOD AND THEORY IN OCEANIC FAUNAL ANALYSIS: A VIEW FROM ISLAND
MELANESIA.

The concern for culture historical reconstruction which continues to characterize much of Oceanic archaeology often has resulted in the neglect of faunal remains. Recent research by the author in the northern Solomon Islands recovered a rich faunal record dating from the Pleistocene to the recent past (28,000-5000 BP). Analysis of this material, including both marine shell and bone, is discussed with an emphasis on the methodology employed. This discussion is subsequently expanded to include a critical examination of general methodological issues in Oceanic faunal analysis.

Widmer, Randolph J (Houston)

[305] RITUAL SPACE IN TEOTIHUACAN APARTMENT COMPOUNDS.

Extensive excavation in the site 33:S3W1 of Teotihuacan, a Classic period apartment compound, resulted in a broad range of architectural and feature data relevant to ritual activity within the compound. The location and context of these ritual features indicates association with a number of distinct social levels, including the maximal compound, the extended family, and the household. The function of these rituals can be reconstructed. New insights into Teotihuacan ceremonial life are revealed, including the importance of compound ancestor worship, and the importance of imported exotic materials—"jade" and marine shell—in the ritual behavior of low status compounds.

Widmer, Randolph J (see Person, Donald A Jr) [602]

Wilcox, David R (Museum of Northern Arizona)

[403] THE CHANGING STRUCTURE OF MACROREGIONAL ORGANIZATION IN THE
NORTH AMERICAN SOUTHWEST: A NEW WORLD PERSPECTIVE.

Besides seeking pre-Clovis sites, a way to test the hypothesis that New World prehistory south of Alaska is the story of the differentiation of a single culture is to see if it accounts for post-Clovis data. It is suggested that southwestern data do fit. The emergence and evolution of Hohokam and Chacoan cultural identities and regional systems are then compared. It is shown that their spatial scales are comparable but their internal organizations and the timing of their transformations sharply contrast. The macroregional fields in which both were embedded are sketched and their reconfiguration into two macroeconomies is postulated.

Willems, Willem J H (Dutch State Archaeological Service)

[408] CONTINUITY AND CHANGE AT THE ROMAN RHINE FRONTIER.

Obviously, the Roman conquest brought about major changes in the settlement systems of northwestern Europe. These changes are easily demonstrated by the introduction of new settlement types such as towns, military installations, and villae. It is, however, equally relevant to examine the nature and the degree of change in the existing Iron Age settlement system. In the Rhine delta, 20 years of excavations and systematic regional investigations have led to a better understanding of these changes and the way in which the rural tribal population on both sides of the frontier was tied into the new superstructure.

Williams, Jeff T (see Montet-White, Anta) [103]

Williams, Stephen (Harvard-Peabody)

[102] THE AFTERMATH OF THE VACANT QUARTER AS SEEN FROM THE YAZOO DELTA:
AD 1500-1700.

Following the Cahokia decline in the 13th century, the ceremonial centers, great and small, of much of the northern end of the Lower Mississippi Valley were also to decline in constructions and

populations. The major exception was the populous St Francis River basin and the adjacent section of the Mississippi River front in eastern Arkansas where De Soto encountered large fortified towns. The Yazoo Delta was quite vacant in this period, but there were some nearby exceptions such as the Lower Arkansas River and the bluff areas enclosing the delta to the east. Some minor usages of the center of the delta occurred, probably of Choctaw origin, from the late 17th century on.

Williams, Stephen (Harvard-Peabody) [Discussant 301]

Williamson, Ray A (Office of Technology Assessment)

[413] ARCHAEOLOGY, TECHNOLOGY TRANSFER, AND PUBLIC POLICY.

The infusion of public into archaeology has the potential to alter dramatically the pursuit of these disciplines. The use of advanced technologies, therefore, inevitably raises issues of public policy. Using examples from case studies, this paper explores areas in which the technology transfer process, from natural science and engineering disciplines into archaeology, could be improved. It also explores what public policies and funding might be needed to support this process.

Williamson, Ray A (see Carnett, Carol) [112]

Willoughby, Pamela R (Alberta)

[613] THE MIDDLE STONE AGE IN SOUTHWESTERN TANZANIA.

The mitochondrial Eve model of modern human origins has refocused attention on sub-Saharan later Pleistocene archaeology. This paper reports on a 1990 survey for archaeological sites along the Songwe River of the Lake Rukwa drainage in southwestern Tanzania. Surface collections were taken from 33 new or relocated sites, 17 of which belong to the Middle Stone Age (MSA). The MSA represents a period of technological transformation beginning 200,000 years ago, and is coeval with the Middle Paleolithic of Eurasia and North Africa. Implications of this research for resolution of the mitochondrial Eve model, as well as land use, are presented.

Wills, Wirt (New Mexico) [Discussant 502]

Wills, Wirt (New Mexico) [Discussant 604]

Wilshusen, Richard H (Advisory Council on Historic Preservation)

[101] SURVEYING THE FIELD: ARE WE LOCATING HISTORIC PROPERTIES ANY DIFFERENTLY THAN WE DID FIFTEEN YEARS AGO?

The regulations implementing Section 106 require federal agency officials to make a reasonable and good faith effort to identify historic properties in areas that will be affected by federal projects. Have we learned anything over the last fifteen years about how to conduct large scale surveys? A survey of approximately 50 agency officials, SHPOs, and contractors is used to evaluate the effectiveness and weakness of current survey methodology.

Wilson, David (Southern Methodist)

[507] SMALL STATES ON THE PERUVIAN NORTH COAST: A SYSTEMS-HIERARCHICAL APPROACH.

Current data suggest that the earliest multi-valley polity on the Peruvian North Coast was the Moche state, at ca AD 400 to 650. Recent excavation and settlement studies in the Casma Valley, however, suggest that valley-wide complexity occurred there earlier, sometime between 1800 BC and 0 AD. Using a systems-hierarchical perspective, this paper addresses the timing and nature of state formation on the North Coast.

Wilson, Douglas C (Arizona)

[703] THE GOLDEN MARSHALLTOWN REVISITED: ENVIRONMENTAL IDEOLOGY AND THE BEHAVIORAL ARCHAEOLOGY OF MODERN AIRLINE AND LANDFILL REFUSE.

Changing attitudes towards the archaeology of modern garbage (including airline garbage) are tied to changes in the perceptions associated with refuse. In this paper, these ideological shifts are studied using behavioral archaeology as a framework. Modern landfill deposits are used to study behavior-based artifact patterning. Formation process, regional variability, and temporal variability are examined to determine if shifting environmental ideologies over the past 40 years have affected the quantities of discard recyclable or otherwise reusable artifacts found in residential secondary refuse. The results suggest that certain ideologies are very imperfectly reflected in the material correlates of behavior.

Wilson, Samuel M (see Versteeg, Aad H) [503]

Wingard, John (Penn State)

[602] EVALUATING THE SUSTAINABILITY OF SOIL RESOURCES IN THE COPAN VALLEY, HONDURAS.

Many researchers treat the agricultural productivity of soil resources as a long-term constant when evaluating the carrying capacity of archaeological catchment areas. This may be a reasonable

assumption under conditions of extensive cultivation. However, as agricultural production intensifies in response to population growth, this assumption becomes untenable. This paper discusses the methodology and results of research carried out in the Copan Valley of Honduras designed to model and evaluate the long-term sustainability of the soil resources and their role in demographic processes at the Late Classic site of Copan.

Winterhalder, Bruce & Carol Goland (North Carolina-Chapel Hill)

[402] FROM SHARING TO SCATTERING: RISK AND THE ORIGINS OF AGRICULTURE.

Empirical studies and simulation models based in the principles of evolutionary ecology show that sharing among hunter-gatherers and field dispersion in pre-modern agriculture are different manifestations of the same risk-minimizing adaptation. A common mathematical model describes each of these situations; to be reliable, subsistence in both cases must be pooled from unsynchronized sources. In this paper we draw on these conclusions to speculate on the role of risk in the evolutionary transformation from food gathering to agricultural food production.

Wolf, Sara J (Textile Museum)

[202] REPATRIATION AND THE CONSERVATION ETHIC.

For a conservator to develop an appropriate scheme for treatment of archaeological or ethnographic materials, considerations of current and future use must be taken into account. If the repatriation of objects is at issue, the code of ethics and standards of practice under which conservators work obligate them to consider the use and/or disposition of such objects in their new settings. While the standards of practice provide ethical limitations on the practical application of interventionist treatment, these standards do not address the more exclusive aspects of artifacts, such as the non-physical attributes of sacred objects. The question becomes one of who should define these standards.

Wooley, Christopher (see Haggarty, James C) [702]

Wright, Henry T (Michigan)

[507] SULTANATES OF THE SOUTHWEST INDIAN OCEAN.

Small states developed on the islands and coasts of the southwest Indian Ocean around AD 950. Traditional explanations for their development—migration, trade, religious movement—are too simple. Comprehensive constructs are proposed.

Wright, Henry T (Michigan) [Discussant 308]

Wright, Henry T (Michigan) [Discussant 603]

Wright, James C (Bryn Mawr)

[507] SMALL STATES AND URBANIZATION: THE MYCENAEAN CITADELS OF GREECE.

This paper takes up three issues concerning the development of Mycenaean society: (1) the process of secondary state formation and its relation to the chronology of the evolution of complex societies on the mainland of Greece during the Late Bronze Age, (2) an evaluation of the extent to which Mycenaean citadels qualify as urbanized, and (3) an overall evaluation of statehood terms of small interrelated city-states or regional polities. The first two issues are presented on the basis of new evidence and analysis of the archaeological material, while the last is a comparison among small states in the New World, the eastern Mediterranean, and Asia, taking into account models and theories of state evolution.

Wylie, Alison (Western Ontario) & David Hurst Thomas (American Museum of Natural History)
[Plenary session 216]

Wylie, Alison (Western Ontario) [Discussant 703]

Wymer, Dee Anne (Bloomsburg)

[302] PALEOETHNOBOTANY IN THE LICKING RIVER VALLEY, OHIO: IMPLICATIONS FOR UNDERSTANDING OHIO HOPEWELL.

The past decade has seen the establishment of an extensive and intensive paleoethnobotanical record for Hopewell habitation and ceremonial sites in the Ohio Licking River valley. The paper explores the implications these data have for the larger theoretical issues of prime importance for understanding Ohio Hopewell. Thus, the paper addresses the nature of the native gardens and the impact of Hopewell subsistence practices on the local ecology, and how both aspects relate to arguments centered on settlement sizes, population dispersion, degree and type of sedentariness, and explore niche width and diversity.

Yarnell, Richard A (North Carolina-Chapel Hill) [Discussant 402]

Yellon, John (National Science Foundation) [Workshop]
[201] THE NATIONAL SCIENCE FOUNDATION.

Yener, K Aslihan (Smithsonian)

[207] MID-THIRD MILLENNIUM METAL ACQUISITION AND METALLURGY IN NORTH MESOPOTAMIA AND SYRIA.

A sizable number of lead isotope measurements have been carried out on Near Eastern copper, bronze, lead, and silver objects. A survey of major regions of metal production in Turkey is being integrated into a comprehensive data bank including ores from across the Near East. It is now possible to identify metal ore sources and metal exchange patterns. The sourcing of Tell Leilan artifacts is compared to data from other third millennium sites.

Yerkes, Richard W (see Toumazou, Michael K) [311]

Yesner, David (Alaska-Anchorage)

[508] FAUNAL INDICATORS OF SOCIOECONOMIC COMPLEXITY AMONG COASTAL HUNTER-GATHERERS: ALEUTIAN AND FUEGIAN PERSPECTIVES.

The analysis of faunal remains from Aleutian and Fuegian sites illustrates both the difficulties and the potential for distinguishing between coastal societies of varying degrees of socioeconomic complexity. The chief difficulty involves obtaining clear associations between households and faunal deposits, which are easier to obtain at less spatially concentrated sites. In general, the best indicators of socioeconomic complexity are those based on relatively subtle features of the faunal record, such as heterogeneity in discard patterns, site specialization, and impact on regional animal populations.

Yesner, David R (see Holmes, Charles E) [312]

Young, Amy L & Susan Andrews (Tennessee)

[104] CERAMICS AND THE ORGANIZATION OF SLAVE LABOR ON AN UPPER SOUTH PLANTATION.

Locust Grove is plantation outside Louisville, Kentucky. The occurrence of identical decorative patterns found on ceramics around the main house and around three slave structures suggests equal access of slaves to masters. This apparent lack of hierarchy in the slave material culture fits well with the model that Upper South plantation slaves were generalized laborers, working in the fields and in the main house as season and occasion dictated. Specialized workers (i.e., domestics or field hands) were economically unfeasible on small slaveholdings like Locust Grove.

Young, D Craig Jr (Nevada-Reno)

[208] LATE ARCHAIC HABITATION FEATURES FROM TWO SITES IN WARNER VALLEY, OREGON.

Recent excavations in two lakeside sites in Warner Valley, Oregon, revealed several depressions containing well preserved habitation features. Excavation exposed four features consisting of collapsed patterns of burned, linear "logs." The logs were dated between 730 F1 80 and 440 F1 80 BP. Sediment and artifact stratigraphy demonstrated that the logs rested on possible house floors. This poster illustrates the excavation, recognition, and interpretation of the habitation features at these two sites. Similar features have been recorded at sites along Lake Albert, Oregon, and in Surprise Valley, California. Comparison of these features allows development of a regional model of lakeside settlement patterns in the northwestern Great Basin.

Zeder, Melinda (see Arter, Susan R) [609]

Zeidler, James (Pittsburgh)

[610] THE PIQUIGUA PHASE: A TERMINAL VALDIVIA OCCUPATION IN NORTHERN MANABI (ECUADOR).

Regional archaeological survey and deep stratigraphic excavations in the Jama River drainage of northern Manabi have demonstrated a Valdivia 8 colonization of the humid upland portion of the valley beginning by 1680 BC. This paper provides an overview of the Piquigua phase at San Isidro (M3D2-001) and related sites, presenting data on settlement pattern, radiocarbon chronology, agricultural subsistence, ceramic production, mortuary behavior, long-distance interaction, and ceremonialism. Finally, current models of Late Valdivia sociopolitical organization and territorial expansionism in western Ecuador are reviewed, and the Piquigua phase is examined within this broader, macro-regional context.

Zeier, Charles D (see Schmitt, Dave N) [612]

Zeitlin, Judith F (see Joyce, Arthur A) [306]

Zeitlin, Robert N (Brandeis) & Arthur A Joyce (Rutgers)

[306] ON THE NATURE OF HIGHLAND-COASTAL SOCIOPOLITICAL INTERACTION IN THE LATE FORMATIVE PERIOD OAXACA.

Comparative evidence of contact with the developing highland Zapotec at Monte Albán during the Late Formative period is examined from recent excavations in two regions on the Pacific Coast of Oaxaca. Shared traits of ceramic style are but the most obvious indicator that the Rio Verde Valley and the southern Isthmus of Tehuantepec had each fallen under the influence of Monte Albán. Similarities and differences between the two regions in local development and interaction with Monte Albán are examined to see if any pattern of highland-coastal sociopolitical relationships can be adduced for this important developmental period.

Zhao, Zhojun (Missouri-Columbia)

[501] A NEW PROCEDURE FOR EXTRACTING PHYTOLITHS FROM SOIL.

A variety of procedures exist for extracting phytoliths from soil. Most are based on the principle of flotation using heavy liquid. However, no comparative data exist on which procedures are most appropriate for recovering phytoliths in different soils, or if using different procedures alters results. This paper reports on experiments carried out to improve phytolith extraction. Significant modifications in common procedures are suggested, for example, in the process of removing certain oxides, dispersion, and in the sequence of processing steps. Results of direct comparisons of phytolith recovery in diverse soils using three commonly used heavy liquids also are discussed.

Zhao, Zhojun (see Baenziger, Marsha S) [501]