

INDIVIDUAL ABSTRACTS OF THE SAA 83RD ANNUAL MEETING

Putt, Shelby [227] see Beney, Megan

Pyburn, Anne (Indiana University)

[110] *The Postclassic, the Postmodern, and the Problem of Alternative Facts*

Contemporary trends in mass media communication indicate serious confusion in the public consciousness about the nature of science and the status of evidential reasoning. Archaeologists, in an effort to make esoteric research programs interesting to the public have contributed to this problem by providing over-simplified stories and “lessons from the past” based on sketchy evidence and mystified analysis. We have allowed public intellectuals from other disciplines to speak for us, and we have failed to address the dangerous gap between what we were saying about the past from what the public was learning about the past. But the past has important implications for the future of archaeology as a discipline, especially if we continue to oversimplify what we know about the ramifications of sociopolitical change for the future of the planet.

[60] *Discussant*

Pye, Jeremy (Cultural Resource Analysts, Inc.)

[221] *Assessing Malaria Risk in 19th Century Tucson, Arizona*

Malaria is thought to have been brought to the Americas by early Spanish explorers. By the late 19th century, malaria had spread through human populations throughout tropical and temperate areas of the Americas, including the American Southwest. Historical documents, maps, and modern GIS data layers (e.g., DEM, soils, vegetation, land use, streams) from the area around Tucson, Arizona, were consulted and entered into ArcGIS (v.10) in order to produce a map of potential vector breeding locations based on a flood water accumulation model. The ArcGIS model and subsequent statistical analyses revealed that nearly the entire Tucson Basin would have been at high risk for malaria transmission, but historical records suggest that malaria differentially targeted certain demographics. Why? This research attempts to tell the story of how cultural and social practices interact with environmental patterns of climate and vector distribution to determine risk of malaria transmission in Tucson.

Pye, Mary E. [136] see Gutiérrez, Gerardo

Qi, Haiping [88] see France, Christine

Qian, Wei [137] see Liu, Siran

Qiu, Yijia (University of Pittsburgh), Julie Hoggarth (Baylor University), Claire Ebert (University of Pittsburgh) and John Walden (University of Pittsburgh)

[302] *Identifying Patterns of Ceramic Compositional Variability from Residential Contexts in Three Late Classic Maya Polities*

Archaeologists have had a long-standing interest in domestic economy because households are often considered to be the primary social unit of production, consumption, and reproduction in most agrarian societies and occupy an important place in the study of ancient state economies. A relatively novel avenue for exploring broader patterns in the domestic economies of ancient Maya polities involves compositional analysis of ceramics. Variability in the compositional makeup of the ceramics can show variability in clay source procurement, which could help identify manufacturing groups and the circulation of ceramics between households. A comparative perspective between different Classic Maya polities will provide a way of discerning concrete patterns of variability. With this in mind, this study explores the composition of Late Classic ceramics from three Maya polities in the Belize River Valley, Baking Pot, Cahal Pech and Lower Dover. These are among the largest Maya polities in the upper Belize River Valley and served as the capitals to small kingdoms in the Classic period (c. AD 250–900). The results will speak to inter-polity differences in ceramic production and distribution at the household level.

Quach, Tony [180] see Whitley, David

Quave, Kylie (Beloit College) and R. Alan Covey (The University of Texas at Austin)

[207] *Camelid Herding and Enduring Community Identities among the Ayarmacas (Cuzco, Peru)*

Indiscriminate invocation of the term ayllu constrains archaeological reconstructions of community organization in the pre-contact Andean highlands. Legacies of earlier generations of anthropological scholarship encourage researchers to assume particular traits of sociopolitical organization. Archaeological and ethnohistoric evidence from the Cuzco region of Peru demonstrates how such assumptions can be an obstacle to developing accurate representations of social organization. As Inca elites extended power in the Cuzco region (AD 1200–1400), they interacted with diverse societies that did not all resemble the monolithic Andean ayllu. One compelling case for reconsidering ayllu organization is Yunkaray, seat of the powerful Ayarmaca polity, located near Maras, 35 km northwest of Cuzco.

This paper uses ethnohistory, regional settlement patterns, and excavation results from Yunkaray to note divergences from classic ayllu attributes. We identify camelid herding as a potentially integrative force in pre-Inca community formation, and examine the public performance of community identity in relation to Yunkaray’s neighboring polities. We trace the enduring Yunkaray community through its sociopolitical apogee and the subsequent forced resettlement of its residents by the Incas. Finally, we consider how the imagined community of Ayarmacas relates to local ayllus that coalesced in the early Colonial period, especially through processes of Spanish resettlement.

Quave, Kylie [100] see Aland, Amanda

Quilter, Jeffrey (Peabody Museum, Harvard University)

[64] *Discussant*

Quinn, Colin (Hamilton College)

[40] *A New Method for Monitoring Socio-economic Changes through Settlement Placement*

There is a recursive relationship between socio-economic institutions and the environment. Decisions about where to place settlements in a landscape were informed by existing economic institutions, but placement of sites in turn effected how social and economic institutions were organized. In this paper, I present a new GIS-based method for quantifying socio-economic organization and change in prehistoric societies. Catchment analyses, as employed in this study, define the availability of economic resources for individual settlements. This approach then quantifies cultural preferences across settlement systems. As a case study, I monitor settlement systems throughout the Early and Middle Bronze Age in southwest Transylvania. Southwest Transylvania is a major metal producing region that underwent significant socio-economic changes as metal became commodified throughout the European Bronze Age. Using catchment analysis, I demonstrate that communities in metal-rich landscapes increasingly prioritized access to agricultural land and access to interregional trade routes over metal ore sources. This result challenges existing narratives for how increasingly complex societies emerged in late prehistoric Europe. The method presented in this paper is easily transferable to other regional contexts and can be an additional tool for archaeologists exploring socio-economic organization and change in the past.

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Quinn, Colin [29] see Beck, Jess

Quintana Ortiz, Luis

[57] *19th Century Factories, Warehouses and Workshops in La Puntilla, San Juan Puerto Rico*

La Puntilla-Marina is a small peninsula located south of the walled city of San Juan, Puerto Rico, and west of the docks. Through the 19th century a series of projects to develop the area, consisting on the construction of colonial government buildings such as the custom's house, armory and a military battery, as well as warehouses and dwellings, were completed. Unfortunately, part of this ward was demolished in in the mid-20th century to give way to the construction of residential units, a large plot of land was converted into a parking lot, and an US Coast Guard Base was established. This study concentrates on creating a chronological timeline of the development of the ward by identifying the factories, warehouses and workshops that were established in this peninsula in the 1800s. Documentary resources like maps, blueprints, photographs, commercial directories and newspaper ads were used to locate these properties and create a virtual map. The main goal is to identify potential archeological research areas for future studies

Quintela, Daniel

[186] *The Lithics of Late Coalition Period Tewa Pueblos: Negotiating Tewa Society in the Rio Chama Valley*

In Ohkay Owingeh's origin tradition the Tewa peoples emerged into this world from the north and traveled south as two separate groups—the Summer and Winter people—before coming together to create a new society in the Rio Chama valley of northern New Mexico. This history parallels our archaeological understanding of diverse peoples, likely migrants from the Mesa Verde region and indigenous Rio Grande populations, who settled the Chama in the thirteenth and fourteenth centuries. However, the origin and identities of these people, as well as how they interacted and negotiated Tewa society, remains poorly understood. I address this issue by comparing two contemporaneous ancestral Tewa pueblos: Palisade Ruin and Tsiping'uinge. Although located only 8 km apart and both built in A.D. 1312, these sites differ greatly in size and architecture and raise questions of the identities of their inhabitants and relationships with one another. I specifically examine the procurement of lithic artifacts. Based on frequencies of materials these villages had different access to local and imported stone, and may have participated in independent socioeconomic networks. This suggests an agreement between archaeological data and the Tewa's own history that Tewa society is an amalgamation of many diverse peoples.

Quintus, Seth (University of Hawaii at Manoa), Jennifer Huebert (International Archaeological Research Institute) and Kyungsoo Yoo (University of Minnesota)

[171] *Examining the Impacts of Non-human Animals on Sequences of Agricultural Change*

Historical sequences of agricultural change are influenced by several key factors. While much attention has been paid to the political context of agricultural production, as well as environmental changes brought about by certain techniques, less has been paid to the active manipulation of productive environments by non-human animals. Within the context of some recent theoretical advances in archaeology and ecology, it has become apparent that animals—intentionally or unintentionally introduced by humans—modify the context under which agricultural production occurs. These modified landscapes are inherited by subsequent generations of producers who are challenged to make minor, and sometimes major, adjustments based on changing landscapes. In this paper, we highlight these processes using case studies from historic North America (e.g., earthworms) and the pre-European Pacific (e.g., rats and birds). We demonstrate that the ecosystem modifications and services provided by animals created a particular kind of path dependency that had ramifications for past peoples, and continues to have consequences for present producers.

Quiroga, Diego [63] see Currie, Elizabeth

Rabinowitz, Adam (The University of Texas at Austin) and Iulian Birzescu (Institute of Archaeology "Vasile Pârvan")

[130] *Communicating in Three Dimensions: Questions of Audience and Reuse in 3D Excavation Documentation Practice*

After excavating the Praedia of Iulia Felix at Pompeii in 1755, architect Karl Weber published the building with an axonometric illustration that showed the remains in three-dimensional perspective. In doing so, Weber communicated additional information about the form of the building in a manner that was both accessible to a lay audience and sufficiently "scientific" for a scholarly one. By contrast, digital 3D documentation methods in current archaeological practice often reinforce a division between "scientific" models intended for internal consumption by the project that produces them, and public communication in the form of lower-quality online digital displays. Using recent fieldwork at the Greek colonial site of Histria in Romania as a case-study, this paper explores the space between high-quality 3D documentation used only by an internal audience and decontextualized 3D content designed for public consumption. In particular, we seek to determine whether high-quality, measurable 3D models derived from photogrammetrical capture are useful in communicating excavation results to other scholars—and if so, in what ways. We evaluate several scenarios for the role of high-quality 3D documentation in both formal and informal scholarly communication, and we discuss the potential for the reuse of such documentation to answer new research questions.

Raczek, Teresa (Kennesaw State University) and Namita Sugandhi (Hartwick College)

[121] *Women's Labor and Scholarship Production in Archaeology: Celebrating the Mentorship of Rita P. Wright*

Rita Wright's transformative work on gender and women's labor in West, Central, and South Asia provided an important framework for the archaeological study of craft production and the organization of labor. This interrogation of gendered practice was complemented by a parallel investigation of equity in academic archaeology, particularly through the work of the SAA's Committee on the Status of Women in Archaeology. In addition to her research and professional service, another significant contribution is Wright's mentorship and support of female students and junior scholars. Although this work is rarely rewarded or acknowledged, here we highlight examples of the guidance she has provided over the years as a way of recognizing and appreciating the tremendous impact she has had on the place of women in archaeology. We also discuss the influence of her work on recent projects in India.

Radding, Cynthia

[131] *Reading Cultural Landscapes in Time and Space: Ostimuri in Historical Archives and Archaeological Remains*

This paper discusses the historical construction of landscapes in the borderlands of northwestern Mexico, with a particular focus on the colonial Province of Ostimuri, bounded by the Yaqui, Mayo, and Fuerte rivers. In honor of Carroll Riley, the paper presents original research in historical archives, analyzed in the context of archaeological, ecological, and ethnographic literatures, to explain the formation of this space as a region and to explore both the vulnerabilities and the resilience of its peoples. Within this multi-disciplinary framework, the paper considers critically different methods of analysis and types of archival and non-textual evidence that contribute to the re-construction of historical processes of colonial encounter and cultural re-creation.

Rademaker, Kurt (Northern Illinois University)

[174] *An Interdisciplinary Approach to Investigate Early Andean Settlement Dynamics and Adaptation*

The Andean cordillera was one of the world's last mountain regions to be colonized by hunter-gatherers. To date, the empirical evidence indicates an initial appearance of humans in the high Andes (up to 4500 m above sea level) in the Terminal Pleistocene, about 12,500 years ago. Early forager sites

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of the Andes exhibit a spectrum of settlement and mobility configurations, which constitute responses to the structure of resources in their specific habitats. Intriguingly, some of the earliest and highest sites indicate thorough familiarity with highland resources, implying either considerable pre-existing cultural knowledge about mountains or very rapid landscape learning. Current debates center on the identification of explorations vs more permanent settlements, functional configurations of early highland sites with those in lower ecological zones, and the role of physiologic and genetic adaptations in the settlement process. Approaches relying solely on assemblages of artifacts and subsistence remains may be inadequate to resolve these issues. Bioarchaeological study of early Andean skeletons, situated within a well-established context of site- and region-scale archaeological settlement data, can provide key information on diet, provenance, mobility patterns, inter-zonal social connections, and the appearance of novel morphologic and genetic features.

[174] *Chair*

Rademaker, Kurt [2] see Haller Von Hallerstein, Sophia

Rafferty, Kevin

[164] *Virgin Anasazi Settlement Patterns in Valley of Fire, Clark County, Nevada*

Since 2003 the College of Southern Nevada (CSN) has conducted five field schools in Valley of Fire designed to teach students proper survey procedure and site recording techniques. Numerous sites (100+) from multiple time periods have been recorded through this work and, when combined with some earlier work from the area, have begun to yield results regarding our understanding of the settlement/subsistence patterns in the area. This paper looks at the settlement data from the Virgin Anasazi period (ca. 2000–850 B.P.), partially building on previous work in the region on the Virgin Anasazi by Margaret Lyneis. The data evaluated so far demonstrate that Valley of Fire is an archaeological region that holds the promise to enhance, or even change, many of our most cherished ideas about the prehistoric occupation of the southern Great Basin/northern Southwestern region.

Raharijaona, Victor [181] see Kus, Susan

Railey, Jim (SWCA—Albuquerque)

[325] *Lithic Assemblage Variability at the Regional Level: Raw Material Conditions, Time, and Site Function*

Several recent excavation projects by SWCA in far southeastern New Mexico have produced an immense dataset on lithic artifacts from 20 sites. This includes attribute data from thousands of individually analyzed lithic artifacts, mostly debitage. The excavated sites collectively cover a large swath across the region, and as such encompass appreciable variation in terms of local raw material conditions, as well as temporal affiliation and site function. Statistical analysis of the dataset was carried out to assess the relative effects of these variables in shaping assemblage patterning between these sites and local site clusters. The findings reveal that raw material conditions have a major influence on assemblage characteristics and variability. But temporal factors, including the changeover from the atlatl to the bow-and-arrow around A.D. 500, is also arguably an important factor behind the observed patterns. So too with site function, the influence of which is underscored by significant differences between selected certain sites. This includes a residential site where a variety of tasks were carried out, versus an adjacent site where activities were narrowly focused on lithic procurement, initial reduction, and perhaps practice knapping by beginners and novices.

Rainville, Charles (University of Oklahoma) and Asa Randall (University of Oklahoma)

[303] *Measuring Ancient Reuse of the Past: Archaic and Woodland Landscape Histories of the St. Johns River Valley, Florida*

The middle St. Johns River valley in northeast Florida was occupied more-or-less continuously beginning at least 9000 years ago. Regional inhabitation by hunter-gatherers involved extensive terraforming of the landscape, including the construction of earthen and shell mounds, in addition to many non-mounded places. Many locations were repeatedly occupied over the millennia, with successive generations modifying or otherwise interacting with existing, often ancient, places. Earlier research took these patterns as evidence for continuity in subsistence and settlement traditions. In this poster, we critically examine the trajectories of site reoccupation regionally in order to identify the context and conditions promoting site reuse through time. We compile site histories of mounded and non-mounded locations, drawing on nineteenth-century observations, twentieth-century salvage excavations, modern surveys, and aerial remote sensing including LIDAR and historic imagery. Our analysis identifies several pathways, including the maintenance of residential spaces and conversion to sacred space, that are tied to broader trends in environmental history, settlement, politics, and cosmology.

Raja, Mussa [221] see Gomes, Ana

Rakotomalala, Omega [168] see Stewart, Ashley

Ramirez, Manuel [262] see Lopez, Julieta

Ramón, Gabriel [333] see Chicoine, David

Ramon Celis, Pedro (Indiana University Bloomington)

[158] *Proyecto Cerro del Gallo, Monte Albán, Oaxaca, participación comunitaria dentro de un proyecto de investigación arqueológica*

El proyecto arqueológico "Cerro del Gallo", se desprende de los trabajos de investigación realizados en el Conjunto Monumental de Atzompa, dentro del sitio arqueológico de Monte Albán. La participación de diversos actores de la población civil, gubernamentales y de la iniciativa privada ha podido concatenarse de tal forma que, se ha podido construir de manera satisfactoria un ambicioso proyecto de investigación, que involucra además de un objetivo académico como lo es el discernir los procesos de crecimiento y decadencia internas de la ciudad arqueológica de Monte Albán, también promover el involucramiento de la población de Santa María Atzompa de su pasado.

[158] *Chair*

Ramsay, Jennifer (The College at Brockport, SUNY) and Noah Haber (The State University of New York Geneseo)

[12] *Examining the Concept of Hinterland in Antiquity in Arid Regions of the Levant Using Archaeobotanical Data and GIS Analysis*

Studies concerning the size of agricultural hinterlands in antiquity have generally been conducted on sites with favorable climates and have become the standard comparative tool. However, little has been examined relating to the size of a settlements hinterland in arid environments even when excellent archaeological evidence for extensive agricultural production, as can be seen in southern Jordan and Israel during the Roman and Byzantine periods. Likewise, a disproportionate focus has been placed upon urban settlements in archaeological research and as a result, the knowledge we possess of rural hinterlands and their contributions to the agrarian economy is largely unknown. Identifying the scale of agricultural productivity in arid environments between urban centers and their hinterlands can be examined using botanical remains overlaid with spatially variant environmental attributes that are deemed essential in the success of agrarian practices. The use of Geographic Information Systems (GIS) can make a complicated process of analyzing the nature and composition of botanicals according to environmental conditions readily possible. Preliminary results of this study

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provide an example of how GIS can aid in analyzing the relationship between settlements and hinterlands in antiquity by comparing plant communities and the corresponding essential environmental parameters they were located within.

Ramsey, Ann [90] see Schroedl, Gerald

Ramsey Ford, Dawn (HDR, Inc.) and Owen Ford (Adams State University)

[268] *Traditional Cultural Practices in America's Last Frontier: Conceptualizing Traditional Cultural Properties in Alaska*

Within the boundaries of the United States' largest state, 44 million acres of land are owned by Native corporations created under the Alaska Native Claims Settlement Act (ANCSA) of 1971. According to the U.S. Census Bureau, approximately one in seven people (15.2% in 2016) in the state of Alaska are Native Alaskan or American Indian. With a significant amount of the Native population managing and utilizing lands their families have occupied for multiple generations, how is the concept of Traditional Cultural Properties (TCP) currently being addressed? How do TCP designations, or lack thereof, affect these resources that may be impacted by proposed projects in the state? The following poster addresses some challenges with TCP designations in Alaska and how the resources are considered during Section 106 compliance activities.

Randall, Connie (University of Tennessee, Knoxville), Meagan Dennison (University of Tennessee, Knoxville), Jay Franklin (East Tennessee State University), Bruce Manzano (University of Kentucky) and Renee Walker (State University of New York at Oneonta)

[35] *Woodland Subsistence in Upper East Tennessee*

This paper describes the species diversity and taphonomic modifications of Woodland Period fauna from Upper East Tennessee. Fauna from both rock shelter and open-air locales from the Early Woodland (ca. 3000 years B.P.) to the Late Woodland (ca. 1000 years B.P.) period are used to characterize subsistence practices and site use in the region. In this paper, we present the MNI, NISP and measures of diversity, richness, and evenness of different animal species identified in the faunal assemblages of more than a dozen Woodland Period sites. We also use taphonomic modifications, such as burning, gnawing, and digestion of bone, to discuss site formation processes. Finally, several dog burials are described.

Randall, Asa (University of Oklahoma)

[295] *The Impersistence of Persistent Places on the St. Johns River, Florida*

"Persistent places"—natural or terraformed locations that draw repeated human action—are unique resources for archaeologists investigating deep-time phenomena. Not only do they allow us to track social and ecological changes anchored in space, the repeated tending to such places set in motion historical path dependencies for descendent communities. However, at the human scale persistence is never a taken for granted, but is produced by the projects of communities who incorporate places into daily, commemorative, and cosmological frameworks. Because places are multi-temporal and relational, they persist in their being enmeshed in associations between persons, ecologies, places, and historical narratives; the linkages between which are subject to transformations as communities attend to present concerns and try to assure futures. The hard work of keeping places from becoming impersistent is immanent in the genealogies of terraformed landscapes of the middle St. Johns River in northeast Florida. There, over the course of nine millennia, hunter-gatherer communities manipulated old places and created new locations for daily living and cosmological reverence. Using depositional histories at shell mounds throughout the region, I track attempts by communities to maintain or recreate continuities in the face of landscape-scale threats from sea level change and attendant ecological transformations.

Randall, Asa [122] see Sassaman, Kenneth

Ranere, Anthony (Temple University)

[260] *The Preceramic Occupation of Greater Chiriqui: An Assessment of Our Current Understanding*

The first substantial evidence of a preceramic occupation of Greater Chiriqui resulted from the 1970 excavations of upland rockshelters in the watershed of the Chiriqui River in Western Panama. Results from these excavations were reported in a 1972 dissertation and the 1980 publication *Adaptive Radiations in Prehistoric Panama*. Our current understanding of the preceramic period occupations in Greater Chiriqui owes more to subsequent innovations in research methods—phytolith and starch grain analyses and AMS dating foremost among them—and explorations of preceramic occupations beyond the boundaries of Greater Chiriqui than from any evidence from more recently discovered sites within the region. This presentation provides a reassessment of the preceramic evidence from Greater Chiriqui and an overview of what we should expect to find in the future.

Rangel, David (David Rangel), Juan Julio Morales Contreras and José Luis Punzo Díaz

[55] *Archeomagnetic Dating of Ceramic Potsherds of the Tingambato Archeological Site*

The archeological site of Tingambato, located in the municipality of the same name, is situated between the towns of Pátzcuaro and Uruapan, in the Mexican State of Michoacan. It is located at the south of the Tarascan plateau, at the boundary between the "tierra caliente" and the cold coniferous mountain land. In order to address the issue of occupational temporality of the site, we carried out absolute archeomagnetic dating of seven ceramic potsherds found at the site, taking advantage of the ability of magnetic minerals, contained within the ceramics, to record the direction and intensity of Earth's magnetic field at the time of its creation or last exposure to fire. This allows us to obtain the most probable age interval for these archaeological materials.

Rangel, Isaac [293] see Ruvalcaba, Jose Luis

Ranhorn, Kathryn (Harvard University)

[227] *Levallois, Learning, and Lithic Variation: Results from Porcelain Flintknapping Experiments*

The ability to transmit cultural information with high-fidelity across generations is a defining trait of modern humans. It is unclear, however, how and when this adaptation emerged in the human lineage. The earliest forms of human technology—stone artifacts—required knappers to understand raw material mechanics, as well as geometry (volume reduction, angles), and physics. Thus, it is often assumed that the spread of lithic technologies involved some degree of information transmission. However, archaeologists lack systematic methods to study the transmission of information from lithic palimpsests. A growing interest in this topic has emphasized design theory (Carr 1995), breaking down lithic technology into a series of independent domains of lithic production (Tostevin 2012) (e.g. core orientation, platform preparation). The research presented here used controlled knapping experiments to understand the influence of varied social learning conditions on these technological domains. The ultimate goal is to define attributes that can be used as proxies for information transmission in Paleolithic assemblages. We simulated two social learning conditions: emulation (lower-fidelity) and imitation (higher-fidelity) as novice knappers were taught Levallois technology. Results suggest that attributes associated with core orientation are more strongly correlated with degree of information transfer than attributes of toolkit morphology.

[227] *Chair*

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Ranslow, Mandy (Connecticut Department of Transportation)

[203] *Quinebaug River Prehistoric Archaeological District and New England Hebrew Farmers of the Emanuel Society Synagogue and Creamery Archaeological Site*

The Connecticut Department of Transportation is the steward of two Connecticut State Archaeological Preserves. This paper will highlight the Preserves and give an overview of how an agency, generally in the business of building roads and bridges, has contributed to the preservation of two significant archaeological districts. The Quinebaug River Prehistoric Archaeological District in Canterbury was listed as a Preserve in 2003. The 22 acre preserve includes five National Register-eligible pre-contact Native American sites ranging from 500 to 4000 years old. These sites were identified and preserved as part of a wetland mitigation site. The New England Hebrew Farmers of the Emanuel Society Synagogue and Creamery Archaeological Site in Chesterfield (Montville) was listed as a Preserve in 2007. It is the remnants of the late-19th/early-20th century Russian Jewish farming community. CTDOT is working with the descendant community to find ways to maintain fragile remains of a creamery building while leaving avenues open for roadway safety improvements. CTDOT and NEHFES are currently collaborating to execute a preservation easement in hopes of obtaining grant funding for the maintenance of this notable Jewish settlement. Working with the State Historic Preservation Office, CTDOT continues to support the protection of Connecticut's rich archaeological heritage.

Ransom, Jeff [195] see DeFelice, Matthew

Rapes, John (Purdue University), Jesse Wolfhagen (Stony Brook University), Max Price (Massachusetts Institute of Technology) and Erik R. Otárola-Castillo (Purdue University)

[103] *ZooaRchGUI: A User-Friendly Graphical User Interface with the R-Programming Language for Archaeologists*

Zooarchaeologists contribute valuable data to the exploration of archaeology's grand challenges. The scale and complexity of these problems requires zooarchaeologists to aggregate and analyze data using rigorous statistical methods while ensuring reproducibility and validity. Because assemblages can contain thousands of data points, conducting statistical analyses on all of the available data in a standardized fashion is difficult. ZooaRchGUI provides zooarchaeologists a free, user-friendly software that harnesses the power of the R programming language. It is currently available for download from the Comprehensive R Archive Network (CRAN). ZooaRchGUI provides a Graphical User Interface (GUI) that reduces direct interaction with R code, increasing accessibility while encouraging replicability and rigor. The program gives users the ability to import and modify data to suit their needs and easy-to-use functions to analyze data using statistical tools and visualize the results. The functionality of ZooaRchGUI is also continuously expanding; it is continuously updated to include innovative statistical tools providing a more stable, intuitive, and replicable user experience. Moreover, future versions of ZooaRchGUI will include broader techniques aimed at archaeologists across all sub-disciplines.

Rareshide, Elisabeth [94] see Minerbi, Joanne

Rasic, Jeffrey (National Park Service)

[50] *A New Radiocarbon Dated Record of Holocene Weapon Technology from the Trail Creek Cave Site, Seward Peninsula, Alaska*

The Trail Creek Caves site on the Seward Peninsula in western Alaska was excavated by Helge Larsen in 1949–1950, and is among the most important archaeological sites in central Beringia. It contains a lengthy, rich and well-preserved paleoecological and archaeological record dating to the late Pleistocene, and the largest collections of mid-Holocene age organic tools from the region. However, poor chronological and stratigraphic controls have hampered the interpretive value of the site. New analyses of the collections at the Danish National Museum were recently conducted to refine the site's age controls, validate Larsen's artifact typology, and evaluate the stratigraphic integrity of the site. Direct radiocarbon dating of two dozen antler and bone tools provide new insights into the evolution of weapon technology and toolkit design, particularly for the Paleonuit (Denbigh Flint Complex) period.

Rasmussen, Amanda

[334] *Fort Halifax Park: A Shared Heritage*

Fort Halifax Park, located in Dauphin County, Pennsylvania, contains archaeological potential for both prehistoric and historic resources alike. The local community is proud of its heritage but lacks the resources and expertise to properly care and manage the property. Future development, which once seemed only a dream for the community, is now a possibility through a joint partnership involving The Friends of Fort Halifax, the Indiana University of Pennsylvania, the Pennsylvania Historic and Museum Commission, DCNR, and Dauphin County. As part of this effort, numerous archaeological surveys have taken place on the Park Property, including a thesis conducted in 2013. The results of the excavation, and the efforts of the community and the partners, produced invaluable results.

Rautman, Alison (Michigan State University)

[205] *Violent Conflict and a Ritual of Memory in the Puebloan Southwest*

Among Puebloan groups of the American Southwest, oral traditions record mythical-historical stories of the often-catastrophic or violent ends of some of the pueblo ruins that dot the landscape (e.g., Hopi Ruin Legends, by Michael Lomatuway'ma, et al., 1993). In other cases, archaeological evidence points to the continued importance of ruins across centuries of time as repositories of meaning across the landscape (Snead 2008). One small feature from a burned pueblo from Central New Mexico records a once-hidden act of memory amid evidence of extensive destruction. Here, at LA-9032, people long ago carefully buried two new corrugated ceramic jars within a maize storage room. Deformed pollen grains in the jar indicate that the masonry walls and charred corn kernels still retaining heat from the fire. This poignant act of remembrance, while hidden from casual passers-by, forms part of the complex story of that particular place, reaches across the centuries, bearing witness again today to long-ago suffering

Raviele, Maria

[133] *Mentoring a Versatile PhD: From Archaeology to an AltAc Career*

The training and mentoring received by Bill's students reflects his dedication to four-field anthropology, as well as a recognition that students may work outside academia. This paper reflects on lessons learned from Bill's seminars, his mentorship, and a four-field anthropological approach to graduate training in the evolution of one student's career from archaeologist to organizational anthropologist and evaluator.

[133] *Chair*

Rawan, Atifa, Jamaludin Shable (Kabul University, Afghanistan), M. Hussain Ahmadzai (Kabul University, Afghanistan) and Jodi Reeves Eyre (University of Arizona)

[268] *The Afghanistan Cultural Heritage Education Program: A Collaborative, International Education Model*

The Afghanistan Cultural Heritage Education Program (ACHEP) is a collaborative project administered by the United States National Park Service and implemented by the Center for Middle Eastern Studies, University of Arizona and the Department of Anthropology and Archaeology, Kabul University. This international outreach effort engages Afghanistan's educators, students, and professionals in educational programs and activities to preserve and protect the country's rich cultural heritage and to enhance Afghanistan's capacity to protect heritage sites and better guard against looting and trafficking. In 2017 an introductory archaeology and anthropology course was co-delivered by instructors from the University of Arizona and Kabul

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University. This poster explores the development of that course, how the team approached technological, physical, cultural, and security challenges and language barriers, and plans to expand the program to include an illicit trafficking of antiquities and art objects course. This course will take into account lessons learned during the first, introductory course. It will be available to members of the Kabul community as well as Kabul University students and faculty. The next course will also be supplemented with local outreach events. The model being developed through ACHEP can be used to develop other cultural heritage education programs.

Rawski, Zoe (The University of Texas at San Antonio)**[30] *Monumental Displays: Ritual Performance and Preclassic Architecture at Early Xunantunich, Belize***

The site of Early Xunantunich in modern day Belize provides the opportunity for a uniquely detailed case study in Preclassic Maya architecture. Thanks to a lack of Classic Period overburden, the Mopan Valley Preclassic Project has been able to conduct extensive excavations of early architecture at the site, documenting important ritual activities from this early time period which likely played a key role in the development of sociopolitical complexity in the region.

This paper focuses on the monumental flat-topped platform that forms the northern boundary of the ceremonial center of Early Xunantunich. In addition to the presence of decorative marine shell ornaments and greenstone effigies which have been interpreted as kingly adornments, recent discoveries of additional buried offerings such as a smashed whole vessel and an uncarved stone monument suggest that this platform was the locus of important ritual activities by at least the Late Preclassic period. These activities share linkages to nearby sites in the valley, and are likely indicative of larger regional sociopolitical processes. Furthermore, our increasing understanding of the structure's form and construction history shows that this platform required a massive investment of labor and materials, modifying the natural landscape in a truly monumental way.

[30] Chair**Ray, Erin (University of New Mexico) and Holley Moyes (University of California, Merced)****[134] *Investigations of Plastered Constructions at Las Cuevas, Belize***

The ancient Maya site of Las Cuevas, in Western Belize features a cave system that runs beneath the main plaza. Investigations by the Las Cuevas Archaeological Reconnaissance project suggest that the site functioned as a Late Classic ritual pilgrimage venue and that the cave was used for large public centrally-organized performances. The cathedral-like cave entrance contains monumental architecture consisting of at least 76 plastered platforms. I hypothesize that the level of managerial oversight should be correlated with the consistency of building materials employed in their construction.

Plasters from both cave and surface contexts were analyzed using geochemical methods including XRF (pXRF), XRD, SEM, EDS and FTIR to examine their chemical make-up. Results demonstrate considerable variation in plaster recipes in the cave and on the surface. This paper will discuss these findings and their implications.

Ray, Erin [136] see Moyes, Holley

Raymond, Tiffany (Binghamton University), Carl P. Lipo (Binghamton University), Matthew Sanger, Timothy de Smet and Anna Patchen (Binghamton University)**[156] *Magnetometer Surveys and the Complex Prehistoric Landscape of Poverty Point, Louisiana***

Poverty Point, Louisiana, is well-known for its massive architecture that includes earthen mounds and six semi-circular ridges. Geophysical surveys conducted over the past decade have revealed that the subsurface of this deposit also contains a large, extensive and diverse set of artificially constructed features. In addition, remote sensing demonstrates that features that have been often described as singular constructions are actually a palimpsest of overlapping depositional events. Here, we discuss the results of our recent magnetometer surveys conducted across Poverty Point in areas of the ridges and near the Mound B field. Our results support recent findings that the prehistoric Archaic landscape of Poverty Point included massive features such as woodhenges, pits, and other types of architectural structures that are not visible on the surface. In specific, we show that the site once included the largest woodhenge known in the Americas, a circle of wood posts that covered roughly 60 hectares. These results support the growing understanding of Poverty Point as the remains of activities that integrated prehistoric communities through repeated episodic group-level activity.

Raymond, Tiffany [156] see Gilleland, Sarah

Razo, Mikaela B. [330] see Saenz Serdio, Martha Adriana

Reade, Hazel [219] see Stevens, Rhiannon

Ream, Randy (AUSA—WDKY)**[193] *Discussant*****Reamer, Justin (University of Pennsylvania- Department of Anthropology)****[85] *Planting the Empty Spaces: Estimating Field Size from Storage Pits in the Upper Delaware Valley***

Landscapes are formed by diverse human actions and interactions with their surroundings through the performance of various tasks, or what Ingold referred to as the "taskscape." Recently archaeologists have turned their attentions to a previously neglected aspect of the landscape created through quotidian tasks, the agricultural field. These studies, however, tend to focus on preserved built structures still visible in the modern landscape. Direct study of agricultural fields in Eastern North America, however, has largely not been undertaken due to an absence of archaeological signatures marking the location of what were often ephemeral, extensive, and complex elements on the landscape. In the Upper Delaware River Valley, the historic Munsee and their ancestors lived on flood plain terraces where they practiced maize based agriculture. Although lacking direct evidence of fields, these people left behind large pits that based on paleoethnobotanical evidence contained maize and other agricultural crops. Using the excavated storage pits at the Shoemakers Ferry site, I estimate the total storage capacity for the site. This storage capacity will be combined with ethnohistorical data on planting practices for the Middle Atlantic and Northeast region to reconstruct the size and location of the agricultural field landscape associated with Shoemakers Ferry.

Reaux, Derek (University of Nevada, Reno) and Geoffrey Smith (University of Nevada, Reno)**[92] *The Paleoindian Archaeology of Guano Valley, Oregon***

During the 2016 field season, the Great Basin Paleoindian Research Unit (GBPRU [University of Nevada, Reno]) began investigating Guano Valley, Oregon for evidence of Paleoindian occupations. Our initial work revealed a rich record of Terminal Pleistocene/Early Holocene (TP/EH) archaeology that appeared strongly associated with an extensive delta system that brought fresh water into Guano Lake from the south. This past field season, the GBPRU returned to Guano Valley and recorded numerous additional Paleoindian sites within the delta system. To date, we have recorded over 600

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diagnostic TP/EH artifacts, predominantly of the Western Stemmed Tradition, making this one of the largest concentrations of Paleoindian material in the entire Great Basin. This poster presents new Guano Valley archaeological and environmental data, as well as an XRF analysis.

Reaux, Derek [92] see Smith, Geoffrey

Rebay-Salisbury, Katharina [87] see Salisbury, Roderick B.

Rebellato, Lilian (Universidade Federal do Oeste do Pará), Denise Paul Schann (Universidade Federal do Pará (UFPA)), Wenceslau Gerales Teixeira (Pesquisador Doutor da Empresa Brasileira de Pesqui), Antônia Damasceno Barbosa (Universidade Federal do Pará (UFPA)) and William Woods (in memoriam)

[116] *The Earthworks at Western of Amazon, Brazil: A Geoarchaeological Perspective*

In this paper, we will bring a geoarchaeological perspective in order to identify settlement patterns in two geometric earthworks (geoglyphs) located in the eastern region of the state of Acre in the Brazilian Amazon. Physical and chemical soil analysis suggests how the past inhabitants on those sites affected the soils. The results show that the settlement pattern and the most important differences from the other regions we have looked at, for instance, in the várzea (floodplain) area. In opposition of the larger villages along the White Water Rivers (at the Amazon or Madeira rivers), in the uplands the dispersed pattern surely existed to make best use of the soils. Therefore, we propose that the geometric earthworks are statements of power within the regional societies, made by people with similar cultural understanding. Soil analysis will also indicate how the people in the past were using the areas and the methods used to build the geometric earthworks. This will help us to have a better understand of the meaning of the geographic earthwork for those societies.

Reber, Eleanor (UNC Wilmington)

[9] *From General to Specific: Targeting Freshwater Resources in Pottery Residues Using Compound-Specific Isotope Analysis*

Direct detection of resources processed in pottery by means of the chemical analysis of absorbed pottery residues is a valuable technique, but identifying specific resources in pottery residues is tricky and problematic. This is due to issues with resource mixing from multiple uses of pottery, as well as the relative rarity of biomarkers unique to specific resources. Advances in compound-specific isotope analysis permit identification of isotopically distinct resources in residues, such as C4 plants in a C3 environment or marine resources. Can compound-specific isotope analysis be applied to the identification of freshwater resources in pottery residues? This study investigates modern freshwater resources and experimentally produced residues to address this question.

Redmond, Brian (Cleveland Museum of Natural History)

[52] *Examining Ritualism in Late Archaic Domestic Contexts: Clay-Floored Shrines at the Burrell Orchard Site, Ohio*

Much past research on the development of Archaic ideological complexity in eastern North America has focused primarily on ritualism and ceremony related to mortuary behaviors. Less attention has been given to ritualism within what is commonly thought of as domestic contexts and without overt mortuary ceremonialism or monumental architecture. The recent discovery of puddled clay architecture (floors) and associated features at the Burrell Orchard site (33LN15) in northeast Ohio provides new evidence for the development of significant, non-mortuary ritualism within Late Archaic basecamp contexts. That such activity took place alongside normal seasonal subsistence tasks is revealed by thick midden deposits containing abundant burned rock, nutshell and deer bone. The several bone and stone tool deposits associated with the floors, along with the labor-intensive nature of the clay construction for what appears to have been individually short-term usage, support the interpretation of these features as shrines possibly associated with hunting ritualism.

Reed, Karen (SWCA Environmental Consultants), Jonathan Libbon (SWCA Environmental Consultants), Aidan McCarty (SWCA Environmental Consultants), Benjamin Demchak (SWCA Environmental Consultants) and Erica Birkner (SWCA Environmental Consultants)

[303] *A Creek in Time: Landscape Archaeology of the Conotton Creek Drainage of Eastern Ohio*

Starting in 2015, archaeological survey for a large natural gas pipeline project investigated large portions of the Conotton Creek Drainage in Eastern Ohio. Prehistoric site clusters, identified during the project and previous investigations along Conotton Creek, provide an opportunity to investigate the prehistoric utilization of the landscape. Analysis of the dataset generated suggests there is patterning in the temporal and spatial distribution of prehistoric sites along Conotton Creek. Expanding the dataset to include other previously recorded sites in the Conotton Creek drainage as well as comparisons between the prehistoric use of the Conotton Creek drainage and larger river drainages, such as the Tuscarora River and the Vermillion River allows for a better understanding of the role of minor drainages in the prehistoric landscape. This poster seeks to highlight the research conducted for the project within the Conotton Creek Drainage regarding how prehistoric groups utilized minor drainages along the margins of the Appalachian Plateau.

Reed, Karen [85] see Libbon, Jonathan

Reed, Paul (Archaeology Southwest) and Carolyn Heitman (University of Nebraska–Lincoln)

[15] *Making the Most of Salmon Pueblo's Enormous Dataset: The SPARC Project*

The ruins of Salmon Pueblo were excavated by Cynthia Irwin-Williams, her staff, and students in the 1970s. A huge archive of material culture, photographs, excavation records, and analytical data was produced documenting Salmon's Chacoan and post-Chacoan occupations. With support from the National Endowment for the Humanities, the Salmon Pueblo Archaeological Research Collection (SPARC) Project was created with the goal of making the enormous Salmon dataset available to scholars through an online portal. This project (due to launch in Spring 2018) will allow users to access more than 15,000 scanned images (photographs, maps, drawings), roughly 35,000 pages of scanned original Salmon field forms, and a relational database structure integrating over 250,000 lines of data from dozens of Salmon databases. When completed, SPARC will provide researchers with unprecedented online access to one of the most important Chaco Canyon Outliers. This poster will discuss the process by which SPARC is being created and preview some of its features.

Reeder-Myers, Leslie (Temple University) and Kathryn Cross (Southern Methodist University)

[84] *Scallop, Clam, and Oyster: 4500 Years of Shellfish Harvest on the Rappahannock River, Virginia*

Today, the Rappahannock River is known for having some of the best oysters on the east coast of North America, and people have been taking advantage of that resource for thousands of years. A large, multi-component shell midden site at Belle Isle State Park provides a glimpse into shellfish harvesting for the past 4500 years, and suggests that the estuary's ecosystem changed significantly over that time period. During Woodland and Colonial phases of occupation, oyster makes up between 98 and 100% of shellfish remains at the site, but represents less than half of the shellfish consumed during the Late Archaic occupation. We explore some of the reasons behind this change, including possible shifts in human settlement patterns based on isotopic analysis of shellfish. We conclude that the faster pace of sea level rise during the middle Holocene promoted the development of a very different ecosystem than the one we see today, with important implications for resource management in the 21st and 22nd centuries.

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Reents-Budet, Dorie (Smithsonian Institution), Ronald L. Bishop (Smithsonian Institution), Joseph Ball (San Diego State University) and Jennifer Taschek (San Diego State University)

[258] *Las Ruinas de Arenal and the Buenavista del Cayo Polity: Political Dynamics in the Western Belize River Valley*

The socio-political and economic interactions of Las Ruinas de Arenal, a small but architecturally rich center in the lower Mopan River Valley, are explored through a focused investigation of select Classic period (250–850 CE) pottery from general occupation and special deposits. The study combines ceramic typological data with evaluations of artistic style and paste chemical composition. Previous archaeological investigations by Taschek and Ball found scant evidence of foreign influence in Las Ruinas elite institutional behavior during the Middle and Late Classic periods in spite of the site being located only 5 kilometers south of Xunantunich, a major Late Classic center closely aligned with the powerful Naranjo polity to the west. This study scrutinizes the ceramic record from Las Ruinas to further assess the socio-political relations of Las Ruinas with local and “foreign” entities.

Reese, Kelsey (University of Notre Dame) and Brian Yaquinto (Bureau of Land Management)

[226] *Mind the Gap: The Mesa Verde North Escarpment*

Archaeologists are inherently limited in their understanding of the past by the quality and quantity of data available. In the US Southwest, we are fortunate to work in a region with a high degree of preservation and long history of archaeological inquiry. Because we work in a region with a dense and well-known archaeological record, we sometimes take what we know for granted and do not critically examine our assumptions. In the Mesa Verde region, extensive survey and excavation have revealed high population densities between AD 600 and 1300 both on and off the Mesa Verde cuesta. We have a knowledge gap, however, on the Mesa Verde North Escarpment. With limited habitation information, we assume the North Escarpment was less densely occupied than the immediately surrounding regions, but our assumptions are the product of missing data and not necessarily a reflection of settlement patterns and landscape use. This poster synthesizes what we currently know, what we do not, and employs a predictive model using the limited available data to help us better understand how the Mesa Verde North Escarpment may have been utilized from AD 600–1300.

Reese-Taylor, Kathryn, Atasta Flores Esquivel (Universidad Nacional Autonoma de Mexico), Nicholas Dunning (University of Cincinnati), Armando Anaya Hernandez (Universidad Autonoma de Campeche) and Debra Walker (University of Florida)

[252] *Monumentality and Horizontality in a Preclassic Cityscape*

During the Preclassic, the inhabitants of Yaxnohcah, Campeche, Mexico constructed more than 13 civic architectural complexes, each at least 20 m in height. These civic complexes were situated throughout roughly a 36 km² area in a carefully planned quadripartite arrangement. Alongside these imposing structures, the early Maya also built massive platforms for public gatherings, large centralized reservoirs, a radial network of inter- and intra-city roads, and extensive agricultural features. In this paper, we argue that the volume and arrangement of the civic architecture and the scale of the infrastructure reflected concepts of both monumentality and horizontality that created a uniquely Maya cityscape.

Reese-Taylor, Kathryn [258] see Walker, Debra

Reetz, Elizabeth (University of Iowa Office of the State Archaeologist)

[168] *Integrating Archaeology and Environmental Education to Strengthen a Place-Based Curriculum*

The practice of archaeology involves studying human adaptation to the natural world by using the environment as a vehicle for the development of knowledge. Archaeology education has strong parallels and intersections with the well-established field of Environmental Education (EE); yet, it is both widely acknowledged that cultural history is one of the weaker components of EE, and many archaeology educators are likewise unfamiliar with EE. In 2016, archaeologists from University of Iowa Office of the State Archaeologist partnered with staff from the University of Iowa School of the Wild, a week-long EE experience for area schools, to create a curricular unit that integrates archaeology and cultural history with EE. Pre- and post-test assessments during the pilot year yielded promising results for using EE as a tool to promote archaeological and environmental stewardship. Additionally, research on Significant Life Experiences in EE is explored in relation to the preservation of cultural resources.

[233] *Discussant*

[168] *Chair*

Reeves, James [14] see Wright, Sterling

Reeves, Jonathan (The George Washington University)

[200] *Landscape Evolution, Digital Terrain Analysis, and the Integrity of Surface Assemblages: A Case Study from the Koobi Fora Formation*

Lithic surface scatters comprise a large proportion of the archaeological record but their value for understanding human behavior is often doubted. Modern geomorphological processes often laterally displace and selectively bias surface assemblages of artifacts. The predictable effects of displacement on the condition, weathering and size distributions of lithic assemblages is better understood. While topography is known to play a role in this process, the degree to which topographic variables contribute to the taphonomy of surface assemblages is understudied. Understanding how topography influences the displacement and taphonomy of surface assemblages provides a potential avenue for assessing the extent to which surface assemblages reflect past human discard patterns. We use digital terrain analysis to investigate the influence of topography on the formation of surface lithic assemblages. The modern geomorphology and topography of the lithic landscapes from the Koobi Fora Formation (Kenya) are characterized by digital elevation models obtained from unmanned aerial systems. Spatial analysis is used to assess the relationship between the modern landscape and taphonomic attributes of surface assemblages. A discussion of the efficacy of this approach for assessing the integrity of surface assemblages is presented. This research was supported by the National Science Foundation, OISE awards 1358178 and 1358200.

[234] *Discussant*

[200] *Chair*

Reeves Eyre, Jodi

[138] *Resources, Goals, and Standards: The Basics of Digitizing Archaeological Collections and Legacy Materials*

Digitization, the conversion of an analog item and creation a digital surrogate, is an important collections management tool. Digitizing collection materials can provide engaging images for public outreach and education, improve knowledge of the collection and access. It also aids in the preservation of materials by creating digital surrogates of content. Digitizing material can rescue content from obsolete media, provide a way for researchers to view content while protecting fragile, physical items, and/or provide a digital version of the item that can be copied and preserved. Digitization can be daunting, though: it requires an investment in people, technology, and space; and an awareness of standards that can appear to be constantly changing. This practical presentation is designed for collections managers, curators, and conservators new to digitizing collections or who want to build on a nascent digitization program. It will also be helpful for archaeologists coping with legacy archaeology materials. The presentation will touch on how to evaluate current resources, short-term goals, and long-term goals. It will also cover the topic of archival standards for digitizing collections, where to find them, and how to select standards for your needs and goals.

Reeves Eyre, Jodi [268] see Rawan, Atifa

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Reger, Brandi [89] see Skowronek, Russell

Regnier, Amanda (University of Oklahoma), Scott Hammerstedt (University of Oklahoma) and Marc Levine (University of Oklahoma)

[248] *Geophysical Prosepection of Monte Albán's Main Plaza: An Overview of Results*

During the summer of 2017, the Proyecto Geofísico de Monte Albán (PGMA) carried out a large-scale geophysical survey of the site's Main Plaza. The survey utilized three instruments, a gradiometer, an electrical resistance meter, and a ground-penetrating radar array and achieved nearly 100 percent coverage of the plaza. Covering more than 35,000 m², the PGMA represents the most extensive geophysical survey ever carried out in Oaxaca. This paper details the methods of the survey, examines which instruments were most effective, and presents results from all three technologies.

Regnier, Amanda [119] see Savage, Sheila

Rehren, Thilo [137] see Liu, Siran

Reid, Connie [106] see Pedro Black, Marielle

Reid, David (University of Illinois at Chicago) and William Ridge (University of Illinois at Chicago)

[6] *Obsidian Procurement and Exchange in Peru: A Social Network Analysis (SNA)*

Wider accessibility to analytical instruments has resulted in the rapid expansion of geochemical datasets useful to trace archaeological materials such as obsidian to their geologic source. While these findings are useful on a site-to-site basis, this paper utilizes Social Network Analysis (SNA) as an exploratory tool to investigate broad-scale patterns of obsidian procurement and exchange in prehistoric Peru. Alongside visualizations of this large dataset, centrality measurements allow us to identify key nodes in likely exchange networks, instigating new questions on prehistoric economies and inter-regional connections. The resulting analysis provides a diachronic comparison of obsidian use in the Central Andes with consideration to varying geographic and political scales that include the domestication of camelids, the development of urban and temple centers, and the first state-level economies.

Reid, LaMarise (William & Mary)

[233] *Discussant*

Reid, Rachel (Washington University in St. Louis) and Xinyi Liu (Washington University in St. Louis)

[336] *Meat or Grains: Compound Specific Carbon Isotope Analysis along the Northern Edge of the Tibetan Plateau*

Various foothills, oases and valleys along the north edge of the Tibetan Plateau played important roles in the process of food globalization in prehistory. These are the key corridors that brought southwest Asian animals along with the western grains into China and Chinese cereals to the West. Recent research demonstrates that broomcorn and foxtail millet (both C4 plants) were the key staple food in this region during the third and second millennium BC, but it remains unclear to what degree humans also relied on animal protein. Here we closely examine the dietary importance of grains and meat at several sites in western China from this period. We compare previous bulk collagen stable isotope results with compound specific carbon isotope analyses of individual amino acids extracted from human and animal bone collagen. Because essential and non-essential amino acids reflect different components of diet, compound specific carbon isotope analysis offers a means to isotopically distinguish between protein and non-protein dietary components, making it possible to determine to what degree humans were consuming meat directly versus consuming animals that were fed millet. Preliminary results for humans from Huoshaogou corroborate previous Bayesian mixing model estimates by suggesting that humans were consuming millet directly.

Reid, Sean

[210] *Satellite Remote Sensing and Archaeological Survey in Central and Western Regions, Ghana*

Humans have inhabited southern Ghanaian forest for millennia, and nearly everywhere there are traces of human activity in the deep past. This paper discusses my integration of satellite remote sensing with traditional archaeological field methods to study longue durée continuity and transformation in both West African societies and the landscape itself. I am consolidating previous survey data and expanding upon them using several methods of archaeological survey and remote sensing with the broader goal of tracing cultural patterns in the landscape using GIS. Specifically, my work has been testing the informed hypothesis that many sacred groves, hilltops, and low rises in the coastal hinterlands and forests of Ghana were the settlement sites of agricultural communities in the first and early second millennium A.D. To do this I used a combination of satellite imagery analysis, topographic information, and archaeological survey to predictively model and test where these sites will be located based on this hypothesis. I will also discuss some of the similarities, differences, successes, and limitations I have encountered while using remotely sensed satellite imagery for archaeological survey, in direct reference to my previous work identifying archaeological sites through vegetation patterns in Sierra Leone.

Reifschneider, Meredith (San Francisco State University)

[201] *Chair*

Reilly, Matthew (City College of New York) and Caree Banton (University of Arkansas)

[308] *Slavery and Freedom from the West Indies to West Africa*

"Freedom is what you do with what's been done to you" is a phrase attributed to Jean-Paul Sartre. While the French philosopher was concerned with political freedom rather than freedom in the context of slavery, Sartre's words offer lessons for analyzing a vast spectrum of how individuals experienced the conditions of slavery and freedom. This paper explores an ambitious project of freedom and future-making initiated by a group of Barbadians one generation after emancipation in the English Caribbean. In 1865, the Cora landed in Liberia in order for free Afro-Barbadians to assist in the "civilizing" process already underway in the nation. We offer some preliminary thoughts on the material signatures of slavery and freedom observed in Crozierville, the small town established by the Barbadians. The Barbadian settlement in Liberia came to exhibit some of the attributes of the colonial society of their homeland that had been dominated by slavery just 30 years earlier. While the "Love of Liberty" brought Barbadians to Liberian shores, semblances of slavery are still visible on the social and physical landscape, highlighting the fragility of freedom in addition to the complexities of freedom-making for Africans and people of African descent on both sides of the Atlantic.

Reimer, Paula [137] see Hunt, Chris

Reindel, Markus (German Archaeological Institute, Bonn, Germany) and Franziska Fecher (University of Zurich)

[299] *The Imbalanced Archaeology of Honduras: Challenges and Potentials*

This paper presents a brief overview over past and current trends in non-Maya archaeology of Honduras. From the beginnings of archaeological investigations in Honduras, there has been a strong research focus on the Maya city of Copan in the extreme west of the country. But already in early years, pioneers like William D. Strong, Doris Stone and Claude Baudéz made valuable contributions, in order to reveal the hidden history of central

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Honduras, the Atlantic and the Pacific coast. The lack of research in these regions of Honduras in the following years, due to the ongoing interest in the influence of the Maya culture in western Honduras, and also to the difficult sociopolitical situation, resulted in an imbalance of archaeological research which today prevents the understanding of cultural processes between Mesoamerica and Lower Central America.

In recent years, new archaeological projects were started which reveal the great potential of research in the hitherto less studied regions. A well trained new generation of archaeologist is using new methodologies and technologies to systematically study settlement patterns, regional chronologies and intercultural relations. This new research results in the definition of new strategies for archaeological research in Honduras in the future.

Reindel, Markus [141] see Mader, Christian

Reinhardt, Eduard [224] see Fletcher, Beatrice

Reitsema, Laurie [188] see Van Hagen, Logan

Reitz, Elizabeth (University of Georgia)

[217] *Rare Animals at a Mississippian Chiefly Compound: The Irene Mound Site (9CH1), Georgia, USA*

The Irene site (ca. AD 1150—1450) was a small, prestigious community occupied by a chief and his lineage. It was located on the Savannah River, a few kilometers inland from the Atlantic Ocean. The presence of animals rare in the region and animals rare or absent in other coastal assemblages distinguishes the Irene collection from other tidewater collections. Many of these animals exhibit atypical, even dangerous, behavior. Rare animals, and other attributes, provide a standard for assessing ritual activities, site functions, and the status of specific residents at this and other coastal sites.

Reitze, William (University of Arizona)

[182] *Of Truck Tires and Kelly Bars: Geoarchaeological Perspectives of a Toolpusher*

Over the course of several summers I had the opportunity to apprentice to Vance Holliday as he worked on the Southern High Plains. Whilst this work typically involved long hot days I had the opportunity to learn a lot of the intricacies of how field work is conducted by itinerant geoarchaeologists. This allowed me to be directly involved in research at some of the most prominent projects in Arizona, New Mexico and Texas. It also exposed me to a cross-section of small towns, motels, and BBQ restaurants few people will ever experience. I learned a great deal about the intricacies of hydraulics and witnessed first-hand the tensile strength limits of steel. I was even exposed to a fair amount of soils and sediment analysis. While these things at times formed a steep learning curve, I had the opportunity to apply them to my own work in the Estancia Basin of Central New Mexico. My dissertation research focused on developing an interpretation of Paleoindian behavior in conjunction with models of shifting environments at the Pleistocene/Holocene transition. This paper will present my research in the Estancia Basin, interspersed with my educational foundation in field geoarchaeology with Vance on the Southern Plains.

Ren, Lele [45] see Ma, Minmin

Renner, Amanda (National Park Service, Midwest Archeological Center), Ralph Hartley (University of Nebraska-Lincoln) and William Hunt (University of Nebraska-Lincoln)

[239] *A Geospatial Analysis Exploring Movement and Perception in the Selection of Alpine Cairn Locations in Southeast Alaska*

In 2013 an intensive archaeological survey of a portion of northern Baranof Island in southeast Alaska, focusing on the slope and crest of Cross Peak Mountain, resulted in the discovery and documentation of fifty loose rock "cairns" estimated to have been constructed 500—1500ypb. These prehistoric alpine features, overlooking the intersection of Hoonah Sound and Peril Strait, are often associated with stories and narrative referencing the "Flood" by Tlingit people from both Sitka and Hoonah (Xutsnoowú) territories. Exploratory spatial analysis of the distribution of these alpine cairns is pursued with the goal of increasing our understanding of Tlingit activities in this alpine setting. Using Geographic Information Systems (GIS) tools and methodologies to examine the environmental characteristics of cairn locations, as well as assess accessibility and visibility, we explore the ancient decision-making that may underlie the placement of these rock features. Different approaches for assessing accessibility including site catchments, least-cost paths, networks, and corridors, as well as varying cost parameters are explored. Potential patterns in the visibility of the surrounding landscape from each cairn location are examined to explore the role of vision and perception in the activities in this setting.

[276] *Discussant*

Renson, Virginie (University of Missouri), Marx Navarro Castillo (Universidad de Ciencias y Artes de Chiapas), Andrea Cucina (Universidad Autonoma de Yucatan), Brendan J. Culleton (Penn State University) and Hector Neff (California State University)

[176] *Tracing Mobility in Pacific Coast and Highlands of Southern Mexico during the Classic Period*

This study presents the strontium isotopic analysis of enamel, dentine and bones of four individuals recovered from two sites (Miguel Aleman and PIN7), dating respectively from the Early and Late Classic period, both located the Pacific coast of Chiapas. The enamel samples of the four individuals have a Sr isotopic composition that varies between 0.70540 and 0.70631 for the 87Sr/86Sr ratio. The results were compared to data available for human bones and teeth, as well as rock, plant, water, and clay sources from Mexico and Guatemala. The enamel samples have a Sr isotopic signature that differs from that of the local rocks, plants, water and human remains. They have a Sr isotopic signature compatible with the metamorphic province developed in the valley of Motagua and the Copan area as well as farther northwest of the sites in the upper edge of the piedmont. They are also compatible with samples from sites in the Basin of Mexico and along the Gulf Coast in the northern part of the Veracruz Province. The different hypotheses on the origin of the four individuals are discussed in the context of regional interactions and demographic changes in southern Mexico during the Early and Late Classic period.

Renson, Virginie [187] see Werlein, Amanda

Renteria, Rebecca (University of Arizona Tree-Ring Lab)

[334] *Community Archaeology Starting Young: Local High School Engagement in Tucson, Arizona*

The past few years archaeology has seen an increase in community-based approaches. These approaches are important when addressing issues of who archaeology knowledge, interpretation, and sites belong to. Archaeological interpretations historically come from those in roles of academic authority, but we increasingly see acknowledgement of collaboration and contribution from community members not in those roles. A rise in diversity of cultural and heritage backgrounds among archaeologists is a factor in decentering approaches as they have been traditionally practiced. Encouraging this diversity should begin with archaeology education and exposure before college years. Linking Southwest Heritage through Archaeology is a program that aims to expose high schools students, who are from historically underserved and underrepresented groups in archaeology, to sites and opportunities that may spark interest in their continuing education and activism in archaeology. With a partnership between the National Park Service, University of Arizona, and nonprofit Environmental Education Exchange we have been providing opportunities for students to learn about archaeology while they contribute ideas that are shaped by their cultural and heritage backgrounds. By providing these opportunities we learn approaches to increase diversity in our field while providing a conduit for students to continue involvement in archaeology.

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Reuther, Joshua, Ben Potter (Department of Anthropology, University of Alaska), Nancy Bigelow (Alaska Quaternary Center, University of Alaska), Charles Holmes (Department of Anthropology, University of Alaska) and Francois Lanoe (School of Anthropology, University of Arizona)

[182] *Beringian Landscapes and Human Responses in the Middle Tanana Valley, Alaska*

The middle Tanana Valley of interior Alaska, an unglaciated region of Eastern Beringia, holds a high-resolution record of human-environment interaction that extends over 14,000 years. The Late Glacial and early Holocene landscapes of this region were dynamic with considerable ecological restructuring. Aeolian deposits accumulated in lowland areas and adjacent foothills at relatively high rates, soils were relatively underdeveloped, river down-cutting prevailed across the valley, and wild fires were common. These disturbance regimes and periods of landscape instability fostered a wide expanse of early- to mid-successional mixed vegetation communities that included herbaceous tundra, shrubs and deciduous trees, key habitats for large grazers and browsers that were significant resources for early hunter-gatherer populations.

Major environmental transitions occurred in the region as the Holocene climate warmed and effective moisture increased, including the spread of boreal forests and peat lands, an expansion of lake development, and intensified landscape stability. These transitions introduced changes to the extent of habitat and seasonal availability of mammal and aquatic food resources. We discuss broad human responses to these environmental shifts in this region from the late Pleistocene through the later Holocene.

Reuther, Joshua [332] see Esdale, Julie

Reyes, Omar (CEHA, Instituto de la Patagonia, UMAG), César Méndez (Centro de Investigación en Ecosistemas de la Patag) and Manuel J. San Román (CEHA, Instituto de la Patagonia, UMAG)

[184] *Chronology of the Human Occupation of the North-western Channels of Patagonia (43°-46° S), Chile*

We present results of a systematic radiocarbon dating program carried out in the Chonos archipelago, the northernmost part of the channels of western Patagonia. Eighty-six samples obtained from a variety of archaeological sites, including: strata beneath organic soils, open-air shell middens, caves and rock shelters, individual burials and ossuaries, and modern industrial extraction shell middens, were analyzed. The chronological and spatial distribution of dates along with the analyzed contexts, allows us understanding occupation of this archipelagic territory by marine hunter-gatherer-fishers at different scales. We evaluated the intensity of the archaeological signature starting with the first evidence of occupation at the Middle Holocene (6300 cal BP), to the European contact (16th century) and post contact. We recorded continuities and discontinuities in the use of space, discernible in time and throughout the archipelagic geography. These are used to discuss the human trajectories. FONDECYT Grant # 1170726.

Reyes, Omar [153] see Belmar, Carolina

Reyes Carlo, Ivonne (Independent)

[128] *Atributos y función de las deidades del Clásico en el Centro de Veracruz: una propuesta metodológica*

Una constante en la Costa del Golfo es utilizar elementos de deidades del Altiplano (Tláloc por ejemplo) para interpretar las representaciones de seres con características sobrenaturales pertenecientes a esta área de estudio. Si bien, podrían existir rasgos iconográficos que justificaran esas semejanzas no podemos únicamente traslapar elementos similares entre unas imágenes y otras ya que sólo se obtiene una propuesta parcial sobre su interpretación y tal vez nos aleje de su significado original.

Estas divinidades están plasmadas en todos los materiales arqueológicos e importante también será definir si son deidades o representaciones de personajes investidos. Analizaremos ejemplos en murales, cerámica y piedra de sitios representativos del Centro de Veracruz (Tajín, La joya, Higuera) con el fin de encontrar patrones de representación y acercarnos al panteón centro veracruzano.

Proponemos entonces, partir de una interpretación a nivel local, es decir, de los propios elementos iconográficos de cada imagen. Después ubicarla en su contexto de representación (escena) y por último vincularla en el contexto social, con el fin de conocer a quienes regían los destinos de los habitantes del Centro de Veracruz durante el Período Clásico.

Reynolds, Cerisa R. [182] see Hill, Matthew E.

Rhode, David (Desert Research Institute)

[174] *Tibet before Pastoralism*

The Tibetan pastoral economic system that has evolved over the last several millennia involves permanent high altitude herd management combined with mutualistic relationships with lower-elevation agricultural communities. How this traditional pastoralist system developed in the middle to late Holocene from a prior foraging lifeway remains something of a puzzle, requiring the domestication of the native high-altitude adapted yak, the establishment of sustained relationships between Tibetan foraging societies with lower elevation agricultural communities, and the possibility of conflicts between foraging and pastoralist economic strategies. Based on archaeological evidence from the northeast Tibetan Plateau, this paper hypothesizes some aspects of the economic and social transition from a pre-pastoralist Tibetan subsistence foraging lifeway to Tibetan pastoralism during the middle to late Holocene.

Richard, Francois (University of Chicago)

[181] *Imperial Mixtures and Paradoxes of Government in Colonial Senegal*

This paper examines the travails of colonial government in Senegal, looking specifically at material histories in the rural region of Siin. One tenet of French colonial policy was to govern through the operation of commerce, specifically through the infrastructure of cash-cropping. If peanut agriculture would, in principle, create both wealth for the colony and 'African subjects,' on the ground, peanuts combined with a web of material entities that bent, diverted, or interrupted the flow of imperial power: traditions of community-making; collective attachments to land, self-sufficiency, and ancestral influence; and cultural economies of objects, all of which had long shapeshifted to the beat of broader historical forces. These mixtures of imperial and vernacular materialities—and the fields of agency they set in motion—find expression in the artifact assemblages of village vestiges occupied between 1800 and 1960. Tracing shifts in consumption practices during that period, I reflect on the fraught, ambiguous process of colonial rule, whose effects were chronically interrupted, twisted, or evaded by Siin villagers; at the same time, colonial commerce also gradually wove peasants into a web of dependencies—on markets and the state, primarily—whose strains are still felt in rural Senegal today.

Richards, John (University of Wisconsin—Milwaukee), Sissel Schroeder (University of Wisconsin) and Jarrod Burks (Ohio Valley Archaeology, Inc.)

[215] *Unseen Aztalan: Preliminary Results of a Geomagnetic Survey of the Aztalan Enclosure*

Lynne Goldstein's compilation of a GIS-based map of the Aztalan site, portraying all investigations through 1996, visually integrated almost two centuries of archaeological work at the site in southern Wisconsin. Lynne's map made two things startlingly clear. First, decades of excavations were not all referenced to a common datum and few had left visible surface indications, making it difficult to relocate earlier excavations and avoid re-excavating disturbed contexts. Second, just 10% of the core residential area has been excavated and far less than 10% of the entire site has been

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studied. To gain large-scale spatial control over ancient and modern subsurface disturbances across the site, the authors undertook a comprehensive magnetic gradient survey of the entire palisaded portion of the site. Data were collected using a Foerster Ferex 4.032 4-probe fluxgate gradiometer array mounted on a handcart. Data collection and processing was conducted by Ohio Valley Archaeology, Inc. Results of the survey are leading to a more comprehensive understanding of site organization and refined knowledge of the locations of excavations and other modern ground disturbance activities. Future fieldwork will focus on ground-truthing geophysical anomalies and updating archaeological knowledge of the site for all stakeholders.

Richards, Julian (University of York Archaeology Data Service)

[316] Moderator

Richards, Katie (Washington State University)[267] *A Low Technology Approach to Understanding Fremont Ceramic Production*

Unlike other regions of the American Southwest, many basic aspects of Fremont ceramic production have never been adequately explored, and many of the assumptions about the production process presented in the literature have never been rigorously tested. Low-technology analysis techniques such as re-firing can provide a simple and cost-effective way to begin exploring these processes and test assumptions made by past archaeologists. Re-firing Fremont ceramics has provided new information about the choices made during the production process of the two main types of Fremont painted wares, Snake Valley Black-on-gray and Ivie Creek Black-on-white, some of which contradict previous assumptions. This information includes clay sources, slip choices, and paint pigment composition. These data concerning the production process provide insights into the technological style of Fremont ceramics as well as the communities of practice that produced them.

Richards, Patricia (University of Wisconsin-Milwaukee)

[107] *Law and Ethics: The Milwaukee County Poor Farm Cemetery Excavations in the Context of the Wisconsin Burial Site Preservation Statute*
The 1987 Wisconsin Burial Site Preservation Statute (WisStats 157.70) serves as the basis for the protection of all burial sites in the State of Wisconsin and assures that all human burial sites be accorded equal treatment under the law regardless of age or affiliation. A burial site, under the law, refers to any place where human remains are buried and includes marked and unmarked cemeteries, Native American mounds, small family cemeteries, and other less obvious locations that are reported to the Wisconsin Historical Society. No burials, regardless of age, ancestry, cultural affiliation or condition may be intentionally disturbed without first obtaining a permit from the director of the Wisconsin Historical Society. This law also determines the final disposition of all materials related to the granting of an excavation permit. Excavation at the Milwaukee County Poor Farm Cemetery 2 in 1991 and 1992 and again in 2013 have provided a unique test of the application of the Wisconsin law. This paper examines the legal and ethical issues related to excavation, analysis and final disposition of all human remains, personal artifacts, burial hardware, field notes and field images associated with the excavations at the Milwaukee County Poor Farm Cemetery 2.

Richards, Patricia [215] see Freire, Shannon

Richards-Rissetto, Heather (University of Nebraska-Lincoln)

[320] Moderator

[235] Discussant

[286] Chair

Richards-Rissetto, Heather [40] see Goodwin, Graham

Richter, Kim (Getty Research Institute) and María Eugenia Maldonado Vite (INAH Veracruz)[128] *Domestic vs. Elite Religious Cults: Revisiting the Huastec Tlazolteotl-Ixcuina Deity Complex*

Pre-Columbian Huastec stone sculptures and clay figurines for the most part have been interpreted as deities and assumed to belong to the same religious cult. They also have typically been interpreted through a central Mexican lens and been identified as and associated with Late Postclassic central Mexican deities. Female figures in particular have been interpreted as Tlazolteotl, the central Mexican goddess of parturition, sexuality, and purification—a deity thought to be closely related to the Teenek (Huastec-Maya) goddess Ixcuinan, the lady of cotton. This presentation will reassess this interpretation, taking into account new archaeological data alongside well-known pictorial and textual sources. It also address interpretations of this Tlazolteotl cult from a broader Gulf Coast perspective and consider the Classic-to-Postclassic connections. We propose that although Huastec figurines and sculptures share stylistic features, they indicate different levels of cult. While the female sculptures appear to represent Huastec high-status women, female figurines seem to reflect local domestic cults tied to the cultivation of cotton.

[206] Chair

Rick, John [66] see Slovak, Nicole

Rick, Torben (Smithsonian Institution)[161] *Archaeology, Museums, and the Anthropocene*

While debate continues about when the Anthropocene began, many researchers have shifted focus away from questions about the onset of the Anthropocene to questions of why, how, and what next? Museums are poised to play an important role in societal and scientific conversations about the pressing issues of the Anthropocene and how best to move forward in the age of humans. Building on a variety of ongoing efforts, I discuss the role of museum based archaeological research, collections, and education and outreach in helping frame perspectives on the Anthropocene and engage members of the public in meaningful conversations about the future of our planet. Archaeological data and the long record of human-environmental interactions that we have at our disposal are poised to play a leading role in future dialogue about a host of issues related to the Anthropocene and museums should be at the forefront of this effort.

[192] Discussant

Ridge, William [6] see Reid, David

Ridwan, Nia (Indonesian Ministry of Marine Affairs and Fisheries)[78] *The Development of Marine Archaeology in Indonesia and Southeast Asia Region and the Current State of Underwater Heritage Preservation and Management*

This paper will focus on the development of marine archaeology in Indonesia and Southeast Asia. It will also highlight the interdisciplinary and integrated marine archaeology research programs in the region having aims to investigating shipwrecks, cargoes, and maritime heritage recent condition as well as identifying human and environmental threats. Marine archaeology research, sustainable shipwreck utilization for tourism development, and local people engagement in underwater cultural heritage (UCH) preservation have helped an appropriate shipwreck management as appeared in United State Army Transport (USAT) Liberty shipwreck site in Bali. This paper will also share information on the current state of UCH

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preservation and legal protection issues, for example, some problems faced by the historic World War II shipwrecks, United State Ship (USS) Houston and Her Majesty Australian Ship (HMAS) Perth; the good prospect of long term on-site shipwreck monitoring involving local communities and general public; public education and awareness programs; as well as capacity building activities in local, national, regional, and international levels. It is expected that this paper will give a better understanding that marine archaeology in Indonesia has contributed in improving communities welfare and providing scientific-based recommendations for local and central government on site protection and management plan.

Riebe, Danielle (The Field Museum of Natural History) and János Dani (Déri Museum)**[245]** *A Dynamic Past: The Prehistoric Interactions on the Plain Project*

The collaborative, American-Hungarian Prehistoric Interactions on the Plain Project explores the past through the reconstruction of interactions. Investigations on interactions as an active mode of social investment and social construction challenges normative concepts of “culture” by modeling socio-cultural boundaries as a dynamic and negotiated process, as opposed to a static categorically assigned social unit. Moreover, our research contextualizes regional developments as the result of multi-scalar social processes. Initially, PIPP focused on the regional scale and reconstructed Late Neolithic (5,000—4,500 BC) long- and short-distance interactions between Herpály and Tisza sites through the stylistic, technological, and compositional analyses of lithics and ceramics. The results suggested a strongly enforced socio-cultural boundary between Tisza and Herpály sites in the Körös region. However, by focusing on the regional scale, the local dynamic interactions have been completely obscured. The current phase of PIPP focuses on the local scale at the Herpály site of Csökmő-Káposztás Domb to investigate how variation in household access to long- and short-distance interaction networks resulted in the previously modeled strongly enforced socio-cultural boundaries.

Riegert, Annie (Texas State University) and Lucy Gill (University of California, Berkeley)**[243]** *Mortuary Landscapes and Placemaking through Veneration at the Maya Site of Colha*

Traces of veneration are sedimented within the landscape and the collective memory of its occupants, transforming these spaces into places. Such palimpsests become potent, which, in the case of mortuary landscapes, can manifest in increasingly complex burial rituals through time. The 2017 excavations at Colha revealed a series of 9 interments in the main plaza of the 2000 sector, yielding a minimum number of 13 individuals. This mortuary area initially utilized during the Middle Preclassic was reused during the Late Preclassic, with some later interments cutting into those of the preceding period, as suggested by associated practices and material accoutrements. Zooarchaeological evidence indicates that although certain taxa, including deer, were exploited throughout the entire temporal span, others, specifically ichthyofauna, are characteristic of Late Classic mortuary contexts. The placement of elements from this taxonomic group within vessel burials alongside commingled human individuals is associated with the elaboration of mortuary practices more broadly, which includes complex secondary depositions and increasingly specialized craft production of grave goods. We argue that this change, which corresponds to an expansion of stone tool workshops and population increase at Colha, can be considered an act of veneration specific to this space—an act of placemaking.

Riegert, Annie [302] see Koutlias, Lauren

Rieke-Zapp, Dirk (AICON 3D Systems) and Elisabeth Trinkl (Karl-Franzens-University of Graz, Institute for Ar)**[118]** *3D Comparison of Attic Head Vases*

Several hundred attic head vases are known worldwide and stored in museums and collections. In 1929, Beazley has categorized twenty groups based on stylistic properties and historic methodology. Head vases are assembled in several steps, most important for our comparison is the moulding of the head area. Since moulds were used to shape the heads, our initial hypothesis was to perform a quantitative comparison of head shapes based on digital scan data. Comparison of scan data is straight forward and is very similar to quality control and inspection processes in industrial applications. Initial analysis was performed on older scan data. In addition, a high-resolution fringe projection scanner was employed to scan further head vases in museums in Germany and Italy. Scan resolution and accuracy of approximately 0.1 mm in all dimensions were required to reveal differences below 1 mm. Shape analysis results of the head areas confirm that it is likely that the same mould was used for shaping some of the head vases. According to our results, it is also not unlikely that a first generation of larger head vases was used to prepare moulds for consecutive generations of head vases that are slightly smaller in size.

[118] *Chair***Riel-Salvatore, Julien (Université de Montréal)****[329]** *Acculturation and Its Discontents: Rethinking Models of Interpopulation Interaction during the Middle-Upper Paleolithic Transition*

Given how large the topic of acculturation looms in discussions of the Middle-Upper Paleolithic transition, it is surprising how little attention has been paid to defining it in order to develop operational concepts that can be tested against the archaeological record. In the specific context of the Middle-Upper Paleolithic transition, the notion of acculturation has usually been considered as a unidirectional, one-size-fits-all social mechanism to explain both the appearance of transitional industries and the disappearance of Neanderthals. However, considering the growing genetic evidence of sustained interbreeding between distinct hominin populations during the Pleistocene, it is likely that interpopulation interactions were more fluid and dynamic than often assumed under the acculturation scenario. To account for this, we present here a review of the notion of acculturation and the likely archaeological manifestations of its different forms. We then compare this against the archaeological record of Western Europe in order to demonstrate how a more nuanced and ethnographically-grounded approach to the notion of acculturation is needed in order to properly model and ultimately make sense of the full variety of human experiences in that critical moment of our evolutionary past.

[219] *Discussant*

Riel-Salvatore, Julien [219] see Pothier Bouchard, Genevieve

Riggs, Chuck (Fort Lewis College)**[110]** *Indigenizing Archaeology in the 21st Century*

Nearly 30 years after the passage of NAGPRA, indigenous perspectives and consultation have led to significant positive changes within the practice of archaeology in the United States. Despite these advances, however, it seems that many archaeologists continue to adhere to the letter of the law while disregarding its spirit, suggesting that the colonial imperatives that gave rise to our discipline remain firmly entrenched. The Eurocentric interpretive frameworks, use of loaded terminology, and paternalistic application of science in determining cultural affiliation show that as a discipline, we still have much learn from those whose pasts we attempt to understand. We ought to critically and reflexively evaluate our discipline's very purpose. Instead of self-serving, academic ladder climbing and insensitive explication of scientific “truths,” the practice of archaeology has the power to strengthen indigenous rights to place and to critical resources. As Western scholars, we need to listen more and pontificate less if we truly wish to serve the needs of descendant communities. This is, after all, what NAGPRA and other federal laws ask of us. Regardless of law, however, our professional ethics should compel us to do better.

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Riley, Tim (Prehistoric Museum @ USU Eastern)**[126]** *Fremont Paleocuisine: Reconstructing Recipes from Rectal Remnants*

The role of maize agriculture among the Fremont has been debated for decades. Archaeologists have organized dietary evidence from these widely dispersed communities, including faunal and floral debris, dental calculus studies, and experimental farming and foraging, to examine farming in the high desert. The Fremont farming/foraging frontier provides a framework to explore agriculture along the margins and the importance of diversified subsistence strategies across a network of rural communities.

Aside from the broad patterns of diet derived from skeletal stable isotope data, direct dietary evidence from Fremont communities remains scarce. Researchers have studied only a small number of Fremont coprolites from widely scattered sites. The coprolite record of neighboring Ancestral Puebloan communities is well-documented and contains specimens from maize-dependent nucleated pueblos and earlier dispersed farming villages. This coprolite data, along with specimens deposited by Archaic foragers across the Great Basin and northern Colorado Plateau, situates the Fremont data along a regional spectrum from foraging to agriculture. Framing each coprolite as a menu of consecutive meals yields insight into nuanced aspects of diet, including preparation and cooking techniques as well as deconstructed recipes. Ingredient lists derived from each specimen allow glimpses into the flavor combinations and basic techniques of Fremont paleocuisine.

[290] *Discussant***Rimer, Esther****[15]** *Sampling Archaeology at the National Museum of Natural History*

The Anthropology department at the Smithsonian Institution's National Museum of Natural History holds over 2.2 million ethnological and archaeological artifacts from the USA and all over the world in its collections, including archaeofauna and bioarchaeological specimens. Every year a handful of researchers sample from our collections for destructive and non-destructive sampling analysis. These analyses run the gamut from portable XRF on textile dyes, isotope analysis of oyster shells from middens, and ancient DNA from humans and prehistoric plants. The sampling requests have changed over the years as techniques have evolved- for example, we increasingly have requests to sample ancient DNA. Our curators must balance sampling requests with the need to conserve museum collections for posterity. If you're interested in learning what we have to sample and how to go about getting access, stop by this poster. You will learn what kinds of sampling have been done in the past, and how to increase the likelihood of your future sampling proposal being approved!

Rimer, Esther [139] see Martinez, Maria

Rincon Mautner, Carlos**[136]** *Cave Character, Ritual Performance, and Social Participation in the Mixteca-Puebla Region of Mexico.*

The Southern Mexican Highlands of Southern Puebla and Oaxaca present some of the most varied karstic landforms of Mesoamerica including rock shelters and well-developed sinkholes (dolines) and caverns. Its inhabitants known as the "people of the rain", shared cultural traditions that acknowledged the vital relationships between clouds, mountains, caves that lead to their interiors, and reliable, perennial springs found at the base of mountain ranges. Climatic variability in terms of the timely arrival of the rainy season, rainfall frequency and its duration made prognostication critical, as were the rituals that evolved in which the desire for a bountiful food supply could be expressed. Some caves seem to have served as places where ceremonies focused the social group's intentions aimed at obtaining the favor of the earth and rain deities. This paper analyzes the material evidence for ritual performance drawing from a small sample of caves and rockshelters, in which their unique and wide-ranging character is highlighted.

Ringberg, Jennifer (California State University—Stanislaus)**[165]** *Living Large at Cerro León: A Comparative Look at Living Spaces in the Early Intermediate Period Moche Valley*

The hill slope settlement of Cerro León (AD 1–400) contains all the typical elements of Early Intermediate period residential sites; spaces for cooking, crafting, sleeping and storage. The flow of most daily activity likely occurred between enclosed, roofed kitchens with heavily used hearths and enclosed but sunlit patios for food processing, spinning, weaving, and tool-making. However, some residences at Cerro León stood apart, not only because of their spaciousness and greater number of rooms but also their large dedicated ancestor worship areas and supra-household gathering spaces. Are these houses truly atypical? How do Cerro León's largest residential compounds compare to other residences at the site or to earlier and later patterns of residence in the Moche valley? Are differences apparent among contemporary dwellings elsewhere in the Moche valley—especially on the coast or in the sierra—where topography was less of a factor in construction? I address these questions and related themes in this paper.

Ringle, William (Davidson College), Tomás Gallareta Negrón (Centro Yucatan-INAH), Ken Seligson (USC) and David Vleck (Independent)**[18]** *Hidden in the Hills No Longer: LiDAR Coverage in the Puuc Region of Yucatan, Mexico*

LiDAR imagery is revolutionizing interpretations of ancient Maya demography, land use, and community organization, among other concerns. This paper provides preliminary observations on LiDAR coverage of 200 km² of the Puuc region of northern Yucatan, Mexico, collected in 2017 by NCALM. The Bolonchen Regional Archaeological Project has been working in this area since 2000, and although we have intensively studied settlement at both the urban and intersite level, LiDAR provides the opportunity to assess spatial organization on a far broader canvas. Until now, no Puuc center of any size has been fully surveyed, but these data provide coverage of at least seven centers in their totality. With substantial samples of two broad ecological zones, the LiDAR dataset also provides the basis for testing ideas concerning land management. They demonstrate, for instance, the absence of terrain modifications such as terracing on any significant scale. The distribution of settlement revealed in the imagery also point out the limitations of traditional categories of site analysis.

Ringle, William [162] see Galvan, Melissa

Riordan, Kyle (The Ohio State University), Julie Field (The Ohio State University) and John Dudgeon (Idaho State University)**[8]** *Scanning Electron Microscopy and Geoarchaeology of Naihehe Cave, Fiji*

This poster reports on field-work and laboratory investigations conducted on geoarchaeological samples from Naihehe Cave, located in the Sigatoka river valley of Viti Levu, Fiji. This research employs novel and exploratory methods, including Scanning Electron Microscopy (SEM), Fourier Transform Infrared spectroscopy (FTIR), and Inductively Coupled Plasma Mass spectrometry (ICP-MS) to determine the elemental content of sediment samples and for detailed imagery useful in grain size and shape analysis. These analyses have revealed that the sediments consist of several classes ranging from calcium hydroxide crystals, ilmenite, magnesium aluminum silicates, and calcium silicates that represent naturally occurring parent materials found in the Sigatoka River Valley. Other analyses include petrographic microscopy (XPL), phosphate burnoff, organic matter burn-off, carbonate burn-off, and radiocarbon dating. Geoarchaeological analyses such as these are critical to understanding the natural and cultural history of Naihehe Cave, as the site is associated with the first agriculturalists in Fiji, and may reveal new information pertaining to the settlement of the archipelago during the Lapita and Post-Lapita period. Using these methods adds to the conversation on how traces of human activity can be discerned at the smallest of scales, and how sedimentological "ecofacts" can aid in understanding archaeological deposits.

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Rios Allier, Jorge (Indiana University) and Ma. del Pilar Casado Lopez**[42]** *Public Policies and Rock Art in México*

This paper aims to present an overview of the public policies applied to rock art in Mexico in the last years. This cultural resource is perhaps little known in its entirety, yet presents an invaluable variety for its study. Its registration, conservation, and study have allowed in recent years to know more about the vast heritage which the country has it. One of the goals is also to comment on the public steps that have been implemented in this area in different regions.

Ripley, Kevin, Laura Dzvonick (Los Angeles Pierce College), Tina Nupuf (Los Angeles Pierce College), Noble Eisenlauer (Los Angeles Pierce College) and Ronald Faulseit (Los Angeles Pierce College)**[155]** *Convergence of Tears at Momonga: Spiritual, Social and Personal Interactions of the Multiethnic Mourning Ceremony*

The village of Momonga (Ca-LAN-357) is located in the San Fernando Valley of Southern California, along the pre-Columbian boundaries of multiple ethnic groups. Rock art in the area indicates ritual activities involving people from various cultural traditions, including ancestral Chumash, Tongva, Yokuts, and Tataviam peoples. Excavations in a portion of the site have produced exchange and utilitarian items, such as shell beads, stone beads, amulets, stone bowls, hammer stones, pressure flakes, mortars, and pestles. Yet, there is little evidence for residential occupation. Instead, a significant number of buried offerings and human burials with intentionally broken utilitarian items placed over the bones, lead us to consider this area the locus of ritual activity. In particular, we suggest that the contents of these offerings as well as their placement in close proximity with important terrain features show similarities with modern day Mourning Ceremonies, involving dance, music, spiritual acknowledgment and worship, communication with the dead, physical manifestation of tears, wailing, and body convulsions. In this poster, we present the physical evidence that supports this interpretation and further postulate that the site may have served as a center of convergence between neighboring ethnic groups.

Rissolo, Dominique (University of California, San Diego)**[258]** *The Rise of Northern Maya Ceramic Chronologies: Emerging Perspectives on Middle to Late Preclassic Processual Dynamics and the Legacy of Joseph W. Ball*

Seminal and persistently relevant work by Ball has shaped and reshaped our understanding of Middle to Late Preclassic population movements on the Yucatan Peninsula and the establishment of local potting communities and traditions. Evidence of Middle Preclassic ceramic production in the northeastern-most Maya Lowlands had remained elusive until the mid-1990s. Early Nabanche affinities observed in the locally produced pottery of northern Quintana Roo suggested an expansion of peoples across the northern plains by the mid 7th century BC. Initial movements of populations from the eastern Petén and northern Belize were assumed to be coeval with the appearance of Chicanel Horizon assemblages in the northeast of the Peninsula. However, ongoing research in northernmost Quintana Roo suggests an introduction of the southeastern lowland Mamom tradition at a time earlier than Yucatecan influences from the west. Interestingly, recent excavations in Yucatan have revealed pre-Mamom pottery that may similarly reflect a "heterogenic homogeneity" described by Ball, whereby these earliest of types represent emerging yet distinctive regional traditions with deep ties to the south. Proyecto Costa Escondida (PCE) and Proyecto de Interacción Política del Centro de Yucatán (PIPCY) address these issues as well as Ball's contributions to northern lowland ceramic studies more broadly.

[192] *Discussant***[330]** *Chair*

Rissolo, Dominique [134] see Lo, Eric

Ritchison, Brandon (University of Georgia)**[5]** *Immigration and Transformation: Local Community Response to the Abandonment of a Neighboring Region*

Following the abandonment of the Middle Savannah River Valley at the end of the 14th century, communities on the neighboring Georgia Coast adopted a new settlement system. At the scale of the region, this appears as a dispersal of settlement and an increase in size of the largest population centers that had previously existed. This paper presents the results of the first systematic intra-community survey of a large site on the Georgia Coast. Results show how residents of the site spatially reorganized their community following the arrival of Savannah River immigrants and how this reflects changed socio-political organization.

[5] *Chair***Rivas, Alexander (Washington University in St. Louis) and Brent Woodfill (Georgia State University)****[292]** *Teaching Climate Change in Red States*

Although scientific consensus was reached on the issue of human-made climate change earlier this century, it continues to be a controversial subject in the public sphere. Archaeologists, as scientists interested in a *longue durée* approach to human society and the environment, have thus been thrust into another ideological battlefield as hard-fought as the theory of evolution by natural selection, but with perhaps graver consequences. As we move fully into the Capitalocene, it is of the utmost importance to educate future professionals and politicians about the nature of climate change, its impacts on almost every aspect of our lives and livelihoods, and possible solutions. However, most archaeologists are working within the academy, already seen as a bastion of liberalism, political correctness, and "un-American" viewpoints by many of the people who have already been turned off to the message. The authors of this paper are working in institutions of higher education in Missouri and Georgia, two typical "red states" that are dominated by people who typically do not listen to the climate change message, and they discuss the best strategies and curricula to open students' minds to a scientifically grounded perspective.

Rivas, Alexander [176] see Leight, Megan

Rivas Panduro, Santiago [178] see Arroyo-Kalin, Manuel

Rivera, Antonieta**[28]** *The Architectural and Urban Design Principles of Tenochtitlan*

There exists a vast literature examining every aspect of Aztec culture. Despite this, few studies focus specifically on Aztec architecture and its implications for understanding broader aspects of Aztec cosmology. This paper contributes to our knowledge of Aztec society through an exploration of architectural and urban design principles that guided the building of their cities and ceremonial precincts. By examining ethnohistoric and archaeological sources, and drawing on evidence from several disciplines—art, astronomy, geography, geometry, mathematics and religion—I present a body of information relevant to the study of Aztec architecture and urban planning in order to analyse it from an archaeoastronomical perspective. I present a methodology that allows accurate analyses of the astronomical and topographic orientations of settlements and ceremonial architecture. This methodology integrates a wide range of digital applications including Google Earth, Google Maps, solar charting, topographic analysis, open-content collaborative, geo-location-oriented photo sharing applications as well as a custom-built geometric application. The results allow for a new understanding of: (1) the design principles of the Huey Teocalli, (2) the layout and design principles utilized in the construction of Tenochtitlan and Tlatelolco and, (3) the Aztec remodelling of Tenayuca, Santa Cecilia Acatitlan and Teopanzolco.

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[28] *Chair*

Rivera, Arturo [100] see Baitzel, Sarah

Rivera, Luz Stephanie, Gianfranco Ciassiano (INAH), Ana María Álvarez and David Gárate**[285]** *Huayacocotla's Early Holocene and Middle Archaic Human Occupations*

The Hunter-gatherer Phase in Veracruz and Mexico project has studied the Huayacocotla region, located in the state's northern highlands. Until a few years ago the richness of evidence that these archaeological sites contain were unknown and today they make up part of the little we know about the state's earliest people. Here we review the relative chronology and different occupations for the Early Holocene and Middle Archaic sites by interpreting the alteration, refunctionalization and redistribution of lithic artifacts and tools found so far.

Rivera, Mario (ICOMOS, Chile)**[333]** *The 1973 Seminar on the Lacustrine Kingdoms in the Titicaca Basin*

Co-organized by John V. Murra and Luis G. Lumbreras, this seminar was planned as an international and interdisciplinary study on the Lacustrine Kingdoms around the Titicaca basin (Lupaqa and Paqajes), and their interaction towards the western lowlands. Murra and Lumbreras were able to gather a group of leading Andeanists and students from Bolivia, Peru, Chile, Ecuador, Canada, and the U.S. who worked in the field for almost three months in Southern Peru, Northern Chile, and Bolivia. The Seminar, defined as a scholarly exercise to investigate about how the vertical archipelago thesis worked from the core area out became one of the most important attempt to integrate different research strategies dealing with ethnohistorical and historical documents, archaeological investigations, and ethnography. It represents a turning point in the development of Andean studies that contributed to advance further knowledge and theoretical issues about the Andean world.

[333] *Chair***Rivera, Patrick (University of Maryland)****[296]** *When Is an Artifact an 'Ethnic' Artifact? Case Studies from Ireland and Mexico*

Given the impressive variety of objects produced and used by most ethnic groups, why do some forms of material culture—but not others—come to be identified as signs of ethnic identity? Who makes these identifications, and what sort of work do they do? This paper examines how particular historic artifacts (or representations of them) have come to signify an Irish or Mexican ethnic identity in the contemporary imagination, what role archaeologists have played in this process, and what this might mean for archaeological attempts to recover ethnicity in the material record.

Rivera Prince, Jordi (Fulbright Open Research Fellow, Universidad Nacional de Trujillo), Gabriel Prieto (Programa Arqueológico Huanchaco, Universidad Nacio) and Celeste Gagnon (Anthropology Department, Wagner College)**[270]** *Disturbing the Ancestors: Interpreting Early Intermediate Period Commingled Remains at La Iglesia, Huanchaco Perú*

While the Inca, Moche, and Chimu cultures boast grand sites along the north coast of Perú, much is to be learned about the earlier Gallinazo (50 BC/100 AD–500 AD) Salinar (200 BC–200 AD), and Cupisnique (ca. 1500–300 BC) cultures from small, coastal settlements. The 2017 field season of the Programa Arqueológico Huanchaco investigated these earlier Peruvian cultures during a five week excavation near the Iglesia de Huanchaco, approximately 15 km northeast of the Huacas de Moche. Initial ceramic analysis shows evidence for cultural occupation of Cupisnique through the Moche cultures. Within the lower strata of the Gallinazo occupation, two distinct contexts of layered, commingled human remains were discovered. Individuals are represented by varying degrees of completeness, from isolated fragments to crania and their associated cervical vertebrae, to fully articulated limbs. These two post-mortuary features provide evidence for Moche disturbance of Gallinazo burials. The excavation of these layered, commingled features will be described and basic demographic and health information will be presented. These data will allow for comparison of the two contexts and an examination of the implications of these features for understanding how Early Intermediate Period people interacted with their dead.

Rivera-Collazo, Isabel (University of California San Diego)**[135]** *Coastal Erosion and Extreme Atmospheric Events: Climate Change and Coastal Cultural Heritage in Puerto Rico*

Islands and coastal zones preserve the cultural heritage of maritime traditions and livelihoods. The expected environmental impacts linked to climate change present a severe threat to their preservation, placing heritage at risk of being completely lost, possibly in an instant. Coastal cultural heritage in Puerto Rico has been the focus of research for the last two years, starting with a risk assessment, and continuing with plans for monitoring, documentation and possible intervention. However, the severity of climate change and the intensity of recent extreme events highlights the urgency of these tasks and outpace the research to document and preserve the contexts that have survived until now. This presentation provides an update on the work undertaken on Puerto Rican coastal heritage, contextualizing our progress within the effects that Hurricane Irma had on some of the known and threatened coastal heritage sites.

Rivers Cofield, Sara (Maryland Archaeological Conservation Laboratory)**[149]** *Discussant***Rizvi, Uzma (Pratt Institute)****[201]** *On the Right of Refusal: Decolonizing Archaeology and Equitable Praxis*

Fore fronting that "decolonization is not a metaphor" (Tuck and Yang 2012), this paper demonstrates how decolonization is not just an historical process but rather an action that is political at its core. As global efforts to redefine archaeological practice are underway to ensure a more just and equitable practice, political historiographies of colonial archaeology in high income postcolonies, such as the United Arab Emirates (UAE), must also be investigated. Epistemic violence embedded within colonial archaeology maintains itself under the guise of 'science,' as archaeology continues to make demands upon bodies, landscapes, memories, histories, and heritage.

This paper investigates what refusing to work in inequitable conditions might look like and what sorts of alternative pathways exist for an equitable and decolonized archaeological praxis. This will include entering archaeology (as a discipline) into transdisciplinary dialog with contemporary art and design. Engagement is not limited to a human to human interaction but rather, this paper will consider conceptual engagement as a key facet to epistemic rearrangements. Utilizing over five years of work with collaborators in the UAE, in this paper I will provide multiple formats through which ethical praxis emerged within frameworks of critical pedagogy, public engagement and archaeological practice.

[278] *Discussant***Rizzuto, Branden (University of Toronto) and Justin Jennings (Royal Ontario Museum (ROM))****[154]** *Procurement and Use of Obsidian at the Middle Horizon—Late Intermediate Site of Quilcapampa, Valle de Sigüas, Arequipa, Peru*

This poster highlights emerging results of our ongoing study to further characterize the procurement networks and use strategies of obsidian sources in the south-central Andes during the Middle Horizon (600 CE—1000 CE) and Late Intermediate Periods (1000 CE—1476 CE). We present archaeometric analyses and provenience studies of excavated obsidian objects from the Middle Horizon—Late Intermediate site of Quilcapampa,

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located in the Valle de Sigüas, Arequipa, Peru. In total, 70 objects were analyzed using handheld energy-dispersive x-ray fluorescence spectrometry (pXRF). Preliminary results demonstrate that the obsidian used at Quilcapampa originates from several distinct outcrop sources within the central Andean region, and particular attention is given to how obsidian procurement practices at Quilcapampa varied over time.

Roache-Fedchenko, Amy

[85] *Spatial Modeling of 18th Century Blacksmith Shops*

The location of blacksmith workshops is often noted on historic maps, yet the archaeological attributes of the workshops are often not well understood within the context of the 18th century. Most knowledge of blacksmithing derives from the 19th and early 20th centuries. The various tools and techniques used to produce and repair metal objects are well documented from these later time periods, as is the spatial layout of the blacksmith shops. These depictions of blacksmiths and blacksmithing are often idealized and not an accurate depiction of the archaeological attributes found on 18th century sites. This presentation explores the applicability of a general model for better understanding the ways in which 18th century blacksmithing spaces were used and how these areas become visible in the archaeological record.

Robb, John (Cambridge University)

[54] *The 20th Century Archaeology of the High Mountains: State Projects and the Forces Resisting Them*

The mountains of southern Calabria above 1400 m were used throughout prehistory and history, but except for an attempt to found highland agricultural settlements in the Greek period, they were always used for special purposes rather than as primary centres of habitation. The 20th century saw a massive transformation in land use, with intensive state investment in creating new kinds of mountain landscapes dedicated to special purposes. These purposes included political control, economic exploitation, and the invention of recreational worlds for use by urban dwellers (trekking, skiing, and more recently heritage landscapes). More populist initiatives included the development of religious landscapes of pilgrimage to local shrines, and ongoing bottom-up, informal exploitation of mountain places and resources. Archaeologically, some of these efforts proved successful (notably reforestation, creating a road network, and creating recreational landscapes). Others have proved less so, foundering upon long-term political and structural problems to create a landscape littered with the relics of a wide range of short-lived development projects.

[214] *Discussant*

[54] *Chair*

Robb, John [54] see Michelaki, Kostalena

Robbins, Helen

[322] *Discussant*

Robbins, Lawrence [198] see Goldstein, Steven

Roberts, Emily

[300] *Craft Production and Consumption in the City of Huari: A Spatial Analysis*

In this paper, major focus will be given to metal artifacts and fragments, examined with respect to object type, production technique, and their distribution throughout different architectural spaces during the 2017 excavations of Patipampa, a domestic sector of the Middle Horizon (AD 500–1000) city of Huari. These artifacts, collected during excavation and flotation, will be compared to finished products and fragments belonging to other artifact classes, such as shell, across multiple architectural spaces using Geographic Information Systems (GIS). Spatial analysis will be conducted using GIS in order to assess possible correlations with respect to craft production and consumption by the people who lived in Patipampa, allowing for examination of the organization of urban spaces with regards to production and consumption.

Roberts, Heidi, Janet Hagopian and Richard Ahlstrom

[164] *Margaret Lyneis and the Pottery Traditions of Corn Creek and Ash Meadows in Southern Nevada*

Margaret Lyneis examined pottery collected from surface and excavation contexts at two of southern Nevada's desert oases, Desert National Wildlife Refuge and Ash Meadows National Wildlife Refuge. These rich islands of springs and lush vegetation were occupied fairly continuously from the Early Archaic period, with farming practiced during the Formative and Post-Formative periods. Dr. Lyneis' investigations demonstrated, for the first time, that pottery was made locally during the later periods, with temper for both gray and brown wares consisting of crushed rock obtained from adjacent mountains. This paper summarizes these studies and reflects on the implications of Dr. Lyneis' research for understanding Nevada's prehistory.

Roberts, Jerod (Shumla Archaeological Research & Education Center), Victoria Roberts (Shumla Archaeological Research & Education Center), Amanda Castañeda (Shumla Archaeological Research & Education Center) and Carolyn Boyd (Texas State University, San Marcos)

[180] *A Feasibility Analysis of Rock Art Recorded Thus Far for the Alexandria Project*

The Lower Pecos Canyonlands of southwest Texas is home to over 350 identified rock art sites depicting multiple styles, complexity, and intricacy. In 2017, Shumla Archaeological Research and Education Center launched the Alexandria Project, a three year mission to revisit each known rock art site in Val Verde County and perform baseline documentation, with the aim to answer overarching questions requiring a large and consistent dataset. Our documentation methods utilize Structure from Motion 3D modeling, high resolution gigapanoramas, specialized recording forms, and GPS coordinates. We are collecting a dataset intended for future research and analyses including stylistic variation, attribute identification, and iconographic interpretation. To examine the feasibility of conducting such analyses from baseline data, a test analysis was conducted using a sample of the sites recorded thus far. We conducted figure identification, stylistic classification, and iconographic inventory using only the recording forms, gigapanoramas, and 3D models processed from baseline data. This presentation discusses the results from the analysis along with what further research questions may be addressed from the Alexandria Project dataset.

Roberts, Jerod [180] see Roberts, Victoria

Roberts, Patrick (Group Leader of the Stable Isotope Laboratory, Department of Archaeology)

[213] *'Finding the time': A Long-Term Perspective on Human Interactions with Tropical Landscapes and Its Implications for Sustainability*

Archaeology provides a truly long-term record of anthropogenic landscape interactions and human responses to environmental change. Such a record is particularly important in tropical settings that contain some of the most threatened terrestrial ecosystems in the world today. However, poor preservation and assumed human avoidance have meant that past records of human behaviour have been patchy for these biomes. Here, I review how new methodologies and archaeological interest has enriched datasets of human tropical forest use from the Pleistocene to the historical period. Alongside growing information relating to palaeoenvironmental fluctuations in different tropical regions, I seek to demonstrate that these datasets have much to offer modern conservation and policy-making in tropical regions. From documented millennia of tropical forest hunting, gathering, and burning alteration by hunter-gatherers to agricultural and urban populations surviving and collapsing through significant periods of climate change, I argue that a resource already exists for helping to understand problems facing human populations in tropical landscapes today. Archaeology and

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palaeoenvironmental science can contribute to future predictions of climate change severity and tropical forest degradation, as well as potential solutions and mitigation practices, at a time when these regions are becoming ever more densely populated by our species.

Roberts, Victoria (Shumla Archaeological Research & Education Center)

[180] *Research Questions Driving Rock Art Recording Methodology in the Alexandria Project*

For over twenty years, Shumla Archaeological Research & Education Center has studied and promoted the preservation of rock art in the Lower Pecos Canyonlands along the U.S.-Mexico border. In July 2017, Shumla launched the three-year Alexandria Project designed to gather an extensive dataset from over 350 known rock art sites in Val Verde County, where the majority of US sites are located. Research questions driving data collection reflect two main aspects: geospatial distribution and iconographic content. Are there patterns in rock art site locations? Is there a correlation between other archaeological features and rock art? What are the distributions of key motifs across the landscape? Shumla will provide high-resolution data to better understand distribution, density, range, and context of Pecos River Style pictographs in addition to the lesser known pictographs styles and petroglyphs. This paper explores the Alexandria Project research questions and potential for future research.

[180] *Chair*

Roberts, Victoria [180] see Roberts, Jerod

Robertson, Robin (University of Texas, San Antonio)

[258] *The Terminal Preclassic in Northern Belize Defined*

Joseph Ball has devoted his professional career to masterfully determining how the ceramic complexes at one site related to those at another, generating models for Maya movements and prehistory from the identified similarities or differences between them. Following his example, this paper proposes to take the data from Cerro Maya in Northern Belize and correlate it with other sequences in the region to produce a carefully researched sequence for the region with specific attention to the pre-Tulix and the Terminal Preclassic material. In the process, a definition for the Terminal Preclassic (as opposed to the "protoclassic") will be explicated and its meaning explored.

Robertson, Robin [243] see Sullivan, Lauren

Robichaux, Hubert [30] see Ek, Jerald

Robin, Cynthia (Northwestern University) and Laura Kosakowsky (University of Arizona)

[147] *Terminal Classic Terminal Deposits at Chan, Belize*

This presentation examines a series of terminal deposits at the ancient Maya farming community of Chan in Belize, Central America. We propose a contextual analysis of terminal deposits to facilitate the development of archaeological interpretations that move beyond the static category of "problematical deposits." The terminal deposits at Chan are located in its community center, primarily in two locations: in the eastern temple and southern range structure of Chan's central group. The deposits date to the period of the depopulation and abandonment of the community and are interpreted as terminal deconsecratory acts by the community's final residents. Most terminal deposits were placed on final structure floors and covered by collapse debris that accumulated through time. One unique terminal deposit, on the final structure floors of a diviner's room, was carefully buried in a lens of fine sascab suggesting that special care and attention was taken to "bury" the terminal deposits in this room. Examined in context, Chan's terminal deposits shed light on the uses of key buildings in a community center and illustrate how a dwindling population deconsecrated their buildings at the end of the occupation of a community.

[300] *Discussant*

Robinson, David (University of Central Lancashire, UK)

[214] *Sequencing the Gordian Knot: Implications of the Pleito Main Cave Superimposition Analyses*

The over-painting sequences at the elaborate rock-art site of Pleito, South-Central California, is one of most complex in the Americas. In a region famous for its polychromatic traditions, including Chumash, Yokuts, Kitanemuk, and other Californian native groups, Pleito stands out as the richest in terms of variety of colours, iconography, and over-painting. This over-painting, or superimposition, offers the 'deepest' data rich relative sequence in the region. Integrated work employing analytical and imaging techniques on the Gordian Knot project over the last few years has aimed to disentangle the sequences found in the Main Cave at Pleito by integrating analytical and imaging approaches. With over a dozen panels, multiple dozens of layers, and hundreds of elements, the results offers a unique view of change-through-time in the iconography of the wider region. As this project enters its final year, we present the first interpretation and implications of the Pleito sequence based upon this comprehensive approach.

[214] *Chair*

Robinson, Erick (University of Wyoming), Jacob Freeman (Utah State University), David Byers (Utah State University), Spencer R. Pelton (University of Wyoming) and Robert L. Kelly (University of Wyoming)

[105] *Climate Change, Economies of Scale, and Population Growth in Prehistoric Hunter-Gatherer Societies: A Case Study from Southwestern Wyoming*

Increasing energy consumption returns, or economies of scale, have been illustrated similarly for modern urban societies and ancient complex societies. However, the relationship between underlying scaling relationships and the development and decline of population and social complexity over the long-term are yet to be investigated. This poster addresses their role in hunter-gatherer societies. Using formal mathematical models from macroeconomics, we examine the long-term variability of economies of scale in hunter-gatherer societies from southwest Wyoming throughout the Holocene. We compare means and variances in the scaling relationships between time-series datasets for population growth, social organization, housepits, ground stone, plant and faunal resources. These scaling relationships are then compared to paleoclimate records in order to investigate correlations between different economies of scale over time, population growth, and climate change. In particular, we investigate whether increasing variance in the underlying scaling of proxies for population, subsistence technology and social organization correlates with accelerating climate change and/or precedes major declines in prehistoric population. We develop a theoretical and methodological framework for research on the socio-ecological drivers of tipping points in prehistoric hunter-gatherer populations.

Robinson, Erick [105] see Latorre, Claudio

Robinson, Eugenia

[176] *Cakhay: A Strategic Classic Center in the Kaq'chik'el Maya Area*

Archaeological survey of Cakhay, the largest Classic site (200–800 A.D.) in the Maya Kaq'chik'el area, was carried out in 2017 by the Proyecto Arqueológico del Área Kaq'chik'el (PAAK). The goal of the survey was to determine the limits of the site and survey its periphery. Reconnaissance of 20 sq km found that populations were nucleated on the hillside surrounding the defensive and religious center with some look out sites in the periphery. Within the center and the nucleus of the site, Teotihuacan style Middle Classic incensarios and tripod vessels and Cotzumalguapan style sculpture

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indicate interregional interaction with elite trading centers in the area of Escuintla. Routes of travel, determined by the application of the Least Cost Analysis of GIS, show Cahkay dominated north-south and east-west routes on the western edge of the Chimaltenango plain. It was engaged in trade to the northeast with San Martín Jilotepeque as well. The site had significant roots in the Late Preclassic and had occupations during the Terminal Classic-Early Postclassic and Late Postclassic indicating it was an integral part of the highland network of exchange and communication from Kaminaljuyu to Lake Atitlán and to the Pacific Coast from the Preclassic through the Postclassic periods.

[176] *Chair*

Robinson, Francis “Jess” (Vermont State Archaeologist) and R. Scott Dillon (Vermont Division for Historic Preservation)

[294] *Trends, Traditions, Interregnums, and Continuities: An Examination of the Cultures of the Early Holocene of the Far Northeast*

This paper will examine several early Holocene archaeological complexes producing Late Paleoindian St. Anne/Varney bifaces, quartz unifaces (Early Maritime Archaic), and bifurcate-based Early Archaic bifaces across the Far Northeast. Recent examinations by the authors have raised questions about the timing and spatial extent of some of these complexes and what the patterns or lack thereof suggest about the cultural and technological origins of the Native Americans producing them, their lifeways, and the potential of their coevally in portions of the Far Northeast.

Robinson, Mark [59] see Prufer, Keith M.

Robledo, Ivanna [270] see Black, Valda

Robles García, Nelly (Instituto Nacional de Antropología e Historia)

[158] *Registro y Documentación 3D de la colección de Piedras Grabadas de Monte Albán, una experiencia participativa entre la sociedad civil e instituciones*

Las estelas grabadas de Monte Albán, que forman parte del sistema de escritura más antiguo de América, se han enfrentado a serios peligros de deterioros a lo largo de su historia pasada y reciente. Elaboradas desde 500 a.C., se encuentran entre las más importantes de la escritura prehispánica de las culturas mesoamericanas. En 1994, se tomó la decisión de reunir la mayoría de estelas sueltas de los contextos no originales en una bodega provisional que causó resultados adversos. A partir de 2006 iniciamos un nuevo proyecto para su documentación y resguardo, con la participación del World Monuments Fund, la Fundación Alfredo Harp Helú Oaxaca, e insumos donados por el Gobierno de Japón, instancias que se unieron para ayudar al Instituto Nacional de Antropología e Historia en la tarea de protegerlas. Los resultados nos alientan a continuar en la búsqueda de participaciones extra-institucionales para proteger la memoria prehispánica de Oaxaca, y poder continuar con las investigaciones en torno a este importante tema.

Robrahn-Gonzalez, Erika (UISPP)

[331] *Building Societies of Knowledge*

This paper aims to analyze the implementation of integrative project designs developed with local communities in Brazil, in a bottom-up strategy. The objective is deliver relevant outcomes and outputs to society incorporating local social values to the process.

This strategy is also aligned to the development of UNESCO's Sustainability Science goals, from which archeology cannot be isolated. It considers the development of Cultural Environment Projects, where archeology research has more visibility and encourages more participation when integrated into wider scope studies. In such multi-variable projects, archeology is part of a “bigger picture” and is in dialogue with current issues advocating for integrative approach regulations.

Therefore, we must design methodologies and build an agenda, including:

- The development of an Applied Science, that allies the accomplishment of scientific research with the symmetrical involvement of local communities;
- The intensive use of technology not only to disseminate the research, but especially to increase the involvement of the communities in the construction of Knowledge Societies.

This perspective aims to link archeological evidence based on scientific findings to the history and identity of local communities, positioning archeology within the transdisciplinary studies that are necessary to meet the global challenges of the 21st century.

[331] *Chair*

Roche Recinos, Alejandra (Brown University) and Javier Estrada (Universidad del Valle de Guatemala)

[163] *A Lithic Approach to Economic Organization at Piedras Negras, Guatemala*

Analysis of the production of imported lithic artifacts, especially obsidian and jade, has been important to recent research on the economic organization of the lowland Maya. However, the data for lithic production has come from a few key sites with clear evidence of workshops devoted to the working of such materials. Less attention has been dedicated to the diversity of obsidian and jade working within individual sites, much less across a given kingdom. This paper presents preliminary evidence for heterogeneity in obsidian and jade working in the kingdom of Piedras Negras, notable for being at the tail end in the exchange of obsidian, jade, and other imported lithic goods. The focus is especially on the diversity of production in household versus non-household areas, drawing comparisons with known market and production areas in Mexico and Guatemala, highlighting the connection with the subordinate center of Budsilha that yielded the best evidence to date for lithic production activities, to better understand regional economic dynamics. Macroscopic analyses are complemented by the results of XRF analysis.

Roche Recinos, Alejandra [109] see Golden, Charles

Rock, Carolyn

[67] *Architectural Conformity vs. Slave Identity: An Example in Late Antebellum Georgia*

In 2015, Brockington and Associates conducted Phase III Data Recovery at a middle-nineteenth century field slave settlement within the Colonel's Island Plantation in Glynn County, Georgia. Excavations at five slave dwelling footprints showed that all exhibited nearly identical dimensions and construction techniques. Dwellings appeared to be double-pen wood frame with central chimneys and wooden floors. Rather than set off the ground by wood or brick supports, each dwelling was marked by a perimeter trench and series of eight-inch diameter vertical posts. The architectural landscape consisted of the placement of the double-pen dwellings in two rows of three, separated by an open activity area with open-air structures at either end. The architectural style was consistent with late antebellum efforts to improve slave health and productivity by providing better housing such as wood floors and sturdier dwellings. At the same time, settlement configuration and location were consistent with increased perceived need for control of the slave population amid more frequent news of slave runaways and rebellions. Despite the owners/overseers' efforts at control, our excavations

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uncovered noticeable differences in artifact distributions among the dwellings excavated, revealing individuality within a slave community that is rarely if ever revealed in the historical record.

Rockman, Marcy (U.S. National Park Service)

[247] *Status Update on Archaeology in Relation to the Climate Change Movement*

Archaeology has many connections to climate change: damage and loss due to the impacts of changing environments, the capacity to provide insights for policy and decision-makers about the human processes of adaptation and migration, community connections to the past and the importance of place, citizen science, media coverage, and connections between heritage and identity in conflict, to name only a few. This paper overviews this range of connections and the importance of assessing where cultural heritage, historic preservation, and the field of archaeology particularly, stand in relation to global efforts to address climate change.

[247] *Chair*

Rockman, Marcy [247] see Hritz, Carrie

Rockwell, Heather [77] see Kitchel, Nathaniel

Roddick, Andrew [333] see Janusek, John

Rodgers McGraw, Kendra [268] see Leonard, Daniel

Rodning, Christopher (Tulane University) and Michelle Pigott (Tulane University)

[275] *Native American Responses to Spanish Contact and Colonialism in the American South*

As it did elsewhere around the world, early Spanish exploration and colonization of the American South led to diverse forms of engagement, entanglement, diplomacy, and resistance by Native American groups. Community identity persisted in some places and in some instances, and it was transformed in others. Geopolitical relationships among towns and chiefdoms were altered in diverse ways, both because of colonial exploration, trade, settlement, and missionization, and because of Native American strategies for navigating new geopolitical landscapes and rapidly changing social geography of the colonial American South. This paper considers diverse outcomes to early stages of sixteenth-century Spanish contact and exploration and later stages of Spanish missionization and settlement in the 1600s and early 1700s, with reference to the cases of Cherokee towns in the southern Appalachians, the Calusa chiefdom and its neighbors in southern Florida, the Apalachee chiefdom in northern Florida, and sixteenth-century chiefdoms such as Coosa and Joara.

Rodriguez, Boris [57] see Hernandez-de-Lara, Odlanyer

Rodriguez, Enrique (University of Texas)

[181] *Coins and Empire in Sixteenth-Century Mexico*

Scholars have asked how empires solidify power when colonizers, the agents of empire-building, often have diverse goals and backgrounds and their actions do not necessarily support the goals of the empire. Two answers to this question have received much attention: that empires promote ideologies that support cohesion among colonizers, and that coercion and violence can promote the expansion of empires. I propose a third answer, in which colonizers create varied material forms that may challenge the goals of empire, but later appeal to the king for regulation and control over the material world. To study this proposition, I use the example of coins among Spanish colonizers in Mexico City. Colonizers invented and used a variety of coins, in part by diluting gold into different alloys to make up for the scarcity of gold that they found in the colonies. Thus, they challenged imperial authority by creating new ways of measuring value and wealth (in this case, by creating more wealth with diluted gold). But when they found that their new coins created problems of conversion and exchange, they appealed to the crown requesting regulations over the minting, value, and use of different coins, thereby strengthening imperial authority.

Rodriguez, Gonzalo (Proyecto Arqueologico Huari)

[300] *Replacing Houses and Building a City: Huari, Ayacucho*

Huari urbanism in the Middle Horizon (AD 500–1000) introduced several changes in the landscape and ways of life of people in the Ayacucho region. The construction of walled compounds, contiguous houses or orthogonal cellular architecture, and increasingly dense populations create housing needs that lead the Wari people to innovative solutions. The reduction of open space within internal courtyards, the construction of two- or even three-story buildings, and the probable use of pathways on top of wide walls are some examples. This presentation will compare two different patterns of room filling possibly related to building replacement at the beginning and end of the occupation of the study area, reflecting different approaches to using space in an increasingly urban place.

Rodriguez, Monica (Universidad Nacional Autonoma de Mexico), Vera Tiesler (Universidad Autonoma de Yucatan), Jeffrey B. Glover (Georgia State University) and Dominique Rissolo (University of California, San Diego)

[330] *Living and Dying on the Fringes of the Sea. The Bioarchaeology and Archaeoethnology of the People of Vista Alegre, Quintana Roo, Mexico*

In this paper, we provide a synopsis of the two dozen burial findings from the archaeological site of Vista Alegre, Quintana Roo, recovered during a decade (2008 to 2017). Most of the mortuary contexts from Vista Alegre were documented using detailed in situ recording (archaeoethnology), followed by macroscopic and isotopic research in a collaborative effort between the Georgia State University and the Bioarchaeology Lab of the University of Yucatan. Put in context with other burial series from coeval coastal sites from the Yucatan, our present results showcase quotidian aspects of local lifestyle, diet and health risks, as experienced by the settlers of Vista Alegre. Here, sea products blended in with maize and other inland native staples as locals traded salt and other goods in the midst of growing social and economic networks along the shores of Yucatan. The second part of our talk addresses the deathways of locals, collective mortuary traditions and social identities of local folk, as showcased by cranial shaping and dental decorations.

Rodríguez, Carol (Pontificia Universidad Católica del Perú)

[69] *A Methodological Proposal for the Analysis of Style in Ceramics*

This study explores a recurrent problem in the archaeological field. How to start the analysis of archaeological material? Specifically, how to analyze a ceramic sample stylistically? Based on research carried out at the Cerro de Oro archaeological site on the south coast of Peru, the author proposes a methodology that covers identifiable aspects in most data groups. The study of decorative techniques, the identification of iconographic designs and the observation of distribution patterns will provide us with relevant and necessary information when developing investigations related to archaeological materials, particularly those that focus on the decoration of vessels. The objective of this proposal is to be useful for those researchers who follow this line of work and who need a starting point or alternative ways of approaching their data.

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Rodríguez, María Fernanda [174] see Pintar, Elizabeth

Rodríguez López, Isabel [59] see Borejsza, Aleksander

Rodriguez Suarez, Roberto [323] see Chinique De Armas, Yadira

Rodríguez-Alegría, Enrique [63] see De Lucia, Kristin

Rogers, Lisa (University of Victoria)

[304] *Human-Material Interactions during the Aurignacian of Europe, 35,000–27,000 BP: An Analysis of Marine Shell Ornament Distribution*

This research explores dynamic relationships between people and materials during the Aurignacian period of Europe, 35,000–27,000 BP. More specifically, a network analysis is used to determine whether there are discernible patterns in the geographic distribution of marine shells used for the creation of beads and pendants. As early inhabitants of Europe moved across the landscape they came into contact with others and left behind material traces of these interactions. Whether these artifacts came to be deposited through processes of migration or exchange, marine shells are particularly useful for exploring these processes, as their presence far from the sea can be indicative of dynamic interactions between materials, individuals, and groups.

Through the use of social network analysis software called Gephi, this research visually maps the interactions between sites and regions based on the genera of marine shells present. By creating network visualizations that are analyzed mathematically, in addition to geographic maps of site locations, patterns in the interactions within which materials and people were embedded and entangled are explored. Engaging with theories of materiality, this research sheds light on the active role of marine shell ornaments in the complex interactions between individuals and groups.

Rogers, Mary [183] see Darrington, Glenn

Rogers, Thatcher (University of New Mexico)

[21] *The Northern Periphery of the Casas Grandes World: An Assessment and Update of the Animas Phase*

In the 1930s through 1960s, several sites in southeastern Arizona and southwestern New Mexico were excavated to assess their role in a regional system that spanned across the international border. Many of these sites were characterized by their shared, mixed composition of architectural, ceramic, and iconography traits that did not neatly fit into established archaeological cultures. Subsequently, they became the basis of understanding for the northern Casas Grandes frontier, oftentimes termed the 'Animas Phase'. More recently over the past thirty years, significant progress has been made in understanding the character and extent of the Medio period Casas Grandes culture. However, these new changes in understanding have seldom been applied to the Animas phase assemblages analyzed and site interpretations constructed. This paper reassesses the use and meaning of the Animas phase in response to these developments and seeks to understand incorporated sites not only as a Paquimean 'hinterland', but on the local scale as multiethnic communities integrated into several socio-cultural networks spanning across the borderlands.

Rogoff, David (Methodist University)

[331] *Archaeological Use of Meta-analyses to Limit Researcher Bias: Results from El Coyote, Honduras*

There is extensive evidence that people are self-serving in the interpretation of data and are very likely to reach their desired conclusions. This paper describes the use of meta-analyses for combating researcher bias in archaeological and the results of my research at El Coyote, a Classic Period center in western Honduras.

Roksandic, Mirjana [323] see Chinique De Armas, Yadira

Roland, Jaelyn (University of Wisconsin- La Crosse)

[48] *Cultural Changes during the Protohistoric Period: An Oneota Case Study*

George Milner points out in his 2015 work, "Population Decline and Culture Change in the American Midcontinent: Bridging the Prehistoric and Historic Divide", that reactions and changes by Native Americans during the Protohistoric period were highly localized, and that each tribe was affected differently through direct and indirect contacts with Europeans. The La Crosse locality was inhabited by the Oneota until c. 1625 when the area was abandoned for the Riceford Creek locality (in southeastern Minnesota). This study looks at how the Oneota were affected by European presence on the continent, even before direct contact was made. We see evidence of stress in a change in settlement patterns between La Crosse and Riceford to more protected areas, more utilitarian ceramic vessels, the abandonment of key resources (e.g. wild rice, large river fish, large river mussels, etc.), and an increase in catlinite pipes. During the Protohistoric period, we see the Oneota shifting to a more protective and secluded stance.

Roldan, Jonathan, Marisol Cortes-Rincon (Humboldt State University) and Abby Barrios (Humboldt State University)

[118] *Digital Preservation Era: A Toolbox for Archaeologists to Transition into the Digital Age*

Digital tools, such as photogrammetry and virtual environments have been around for decades. However, it was not until the past decade that the academic community introduced such tools into their work and have taken such discipline seriously. For this reason, the practice, management, teaching and potential of digital archaeology has remained a lagging field. As a response, this paper will provide a guide for traditional archaeologists to assist in the transition to the digital medium. An introduction to the essential vocabulary, theories and must know phases are provided in the paper. In addition, methodologies for a successful digital documentation, preservation and curation are given. Since such discipline is at its infancy in the academic world, we will address the advantages and disadvantages of this new type of data acquisition and post-processing. A complete description of available tools that will advance research questions, interpretations and communication in archaeology is presented here as well. Like any innovation, issues and concerns arise; common and noteworthy issues will be summarized.

Roldan, Jonathan [18] see Cortes-Rincon, Marisol

Romero, Ashuni (Escuela Nacional de Antropología e Historia) and Nelda Issa Marengo (University of California, Riverside)

[330] *Vista Alegre: The Architecture of a Coastal Site in Northern Quintana Roo, México*

El Proyecto Costa Escondida, dirigido por Jeffrey Glover y Dominique Rissolo, ha realizado investigaciones en la costa norte de Quintana Roo, México desde el año 2005. El sitio de Vista Alegre está ubicado en una pequeña isla dentro de la laguna de Yalahau, formó parte de los asentamientos costeros que, a lo largo del litoral de la Península de Yucatán, mantuvieron una circulación de bienes durante la época prehispánica. Estos sitios presentaron y compartieron algunas características arquitectónicas de acuerdo a las regiones y a los distintos periodos. En este trabajo mostramos un estudio comparativo de la arquitectura presente en el sitio de Vista Alegre con relación a la de otros sitios costeros y de la región. Consideramos que, mediante esta comparación, podremos tener un mejor entendimiento sobre algunos de los procesos culturales de los habitantes de la costa norte de Quintana Roo durante el periodo Formativo Tardío y el Postclásico.

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Romero, Danielle M. [325] see Baustian, Kathryn

Romih, Stanislava (Northern Arizona University) and Rafael Guerra (New Mexico University)

[18] *Unleashing the Beast: New Methodologies in Exploring Peri-abandonment Deposits in the Maya Lowlands*

The BVAR project recently renewed its investigations of peri-abandonment deposits at several sites along the Belize River in Western Belize. Also referred to as de facto refuse and problematic or sheet-like deposits, these cultural remains are predominantly recovered in palace rooms and courtyards in site cores across the Maya lowlands. The purpose of the BVAR investigations is to better understand the formation of such deposits as well as their temporal and spatial significance across sites in the Belize Valley region. To accomplish these goals, the project employs microstratigraphic excavation methods that utilize subplot systems for more comprehensive analysis of the assemblages of individual deposits. This paper describes our methodological approach in greater detail, and presents preliminary results of our investigations of terminal deposits at the site of Lower Dover in western Belize.

Rondeau, Michael (Rondeau Archeological)

[120] *Far West Fluted Points: Variability and Trends*

The CalFLUTED project has studied hundreds of Far Western fluted points allowing for a wide ranging recognition of the variability and trends in fluted point morphology, manufacturing technology, use breakage, repair and hafting techniques in the region. Conclusions are supported by study data. Discussion of the implications of those conclusions is provided.

Rondeau, Rob (Simon Fraser University)

[78] *Archaeological Geovisualization Underwater*

New research continues to challenge the "Beringia" explanation of the peopling of the Americas. During the Last Glacial Maximum sea level in the Gulf of Alaska was approximately 100–120 meters lower than present. Vast areas of adjacent coastline extending south along the Pacific Northwest Coast may have been deglaciated beginning about 16,000 BP; providing a coastal corridor for people using watercraft to move south along the coast from eastern Beringia. The focus, now, is locating a coastal migration route. How would one locate early New World archaeological sites underwater?

Underwater surveying techniques, developed in collaboration with related scientific disciplines such as Geophysics and Oceanography, continue to improve the spatial understanding of undersea environments. I refer to this next generation of marine archaeology as "underwater archaeological geovisualization" (UAG).

This paper outlines research focused on new underwater remote sensing technologies, incorporating new computing sciences; such as three-dimensional (3D) imaging, virtual reality (VR), geographic information systems (GIS) and agent-based and virtual modeling, in conjunction with applied technical engineering; developing new underwater remotely operated vehicles (ROVs).

UAG will allow archaeologists to both predict and locate submerged ancient occupational sites as well as investigate these in a way not previously possible.

[78] *Chair*

Roney, John [91] see Whisenhunt, Mary

Ronsairo, Karleen (The George Washington University)

[288] *A Preliminary Analysis of Early Ramos Phase Ceramics from the Mixteca Alta, Oaxaca, Mexico*

During the Late Formative period, social relations were transformed due to increasing political centralization and urbanization in regions throughout Oaxaca. In the Nochixtlán Valley of the Mixteca Alta, Early Ramos phase (300–100 B.C.) ceramics from urban centers in the region reflect significant stylistic change from the preceding Yucuita phase (500–300 B.C.) ceramics. This presents an opportunity to explore how social change may be reflected in stylistic changes of material culture from this period. Changes in ceramic styles in this region, as well as the social practices associated with ceramic production, consumption, and exchange, can be considered to provide a more nuanced view of social change during the urban transition in Late Formative Oaxaca. I conducted visual analyses of Early Ramos phase ceramics from Yucuita and Etlatongo in the Mixteca Alta, which provide a foundation for comparative analyses of ceramic styles and paste compositions of Early Ramos phase ceramics from other Late Formative sites in the region. Future stylistic and paste compositional analyses of these ceramic collections will provide insight into the urban dynamics within the Mixteca Alta and the nature of social relations between urban centers in regions throughout Late Formative Oaxaca.

Roos, Christopher (Southern Methodist University) and William Hockaday (Baylor University)

[182] *Late Pleistocene and Early Holocene Biomarkers from Stratified and Cumulic Soils in Highland Environments of the Jemez Mountains, New Mexico*

Through his meticulous work on stratified and buried soils, Vance Holliday has transformed our understanding of Paleoindian environments in the lowlands of the Southwest and Great Plains. Inspired by Vance's example, we have used a geoarchaeological approach to explore Paleoindian visitation and use of highland environments. Paleoindians have been visiting the Jemez Mountains for obsidian since at least the Folsom period. However, direct archaeological evidence of their presence in and use of highland environments of the Jemez Mountains has not yet been discovered. We use lipid biomarkers extracted from stratified and cumulic soils to reconstruct highland plant communities of the Late Pleistocene and Early Holocene in what are now ponderosa pine forests (2,200–2,600 m). Furthermore, we use fecal biomarkers to infer properties of the Terminal Pleistocene mammalian fauna that may have attracted Paleoindian foragers to the highlands and ultimately to the high-quality obsidian.

[182] *Chair*

Roos, Christopher [224] see Field, Julie

Roosevelt, Anna (Univ. Illinois, Chicago)

[177] *Large Centralized Fired-Clay Cooking Stoves of Communal Households on Marajoara Mounds at the Mouth of the Amazon c. AD 400–1100*

Rarely does the New World anthropological literature mention the existence of large centralized, multi-unit fired clay cooking structures of some prehistoric or recent indigenous Amazonian households. Yet these large, highly patterned features have been informative for archaeology from several points of view. Their existence and common presence as permanent structures built into the floors of prehistoric mound sites on Marajo Island have demonstrated that the mounds they occur in had sizeable, long-term domestic occupations as well as ceremonial remains. Until their discovery, the mounds were assumed to be purely ceremonial monuments. The strong magnetic signatures of stove groups allow them to be mapped by surface geophysical survey, giving potential settlement footprints and thus evidence of site populations and organization, as well as maps to aid excavations. Excavations at and around the structures revealed by geophysical survey revealed that they were set into housefloors, and the extent of the floors indicated that the houses must have been large, multifamily dwellings, a form still common in Amazonia at present. Further useful evidence from the

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excavations has been the identification of small fish and cultivated palm fruits as a staple foods and vegetation patterns with more forest cover than at present.

[317] *Discussant*

Roosevelt, Christopher H. [130] see Moss, Emanuel

Rorabaugh, Adam (Colville Confederated Tribes)

[83] *Precontact Coast Salish Seasonality in Social Networks: A Modeling Approach*

A crucial aspect for examining the production and reproduction of material culture among complex foraging societies such as those of the Pacific Northwest Coast is understanding the relationships between social networks and assemblage diversity. This model examines one small aspect of this issue, seasonal variation in social network size. The model is ethnographically informed by Coast Salish ethnographic household sizes. Assemblage richness and evenness in discrete artifact styles are examined under random social learning, varying seasonal social network size and innovation rate. Larger seasonal aggregations appear to result in a higher frequency of rare types, but this effect is not significant enough to strongly pattern the record of interest. Changes in innovation rate appear to also overwhelm any signals in this aspatial model from differing social network sizes through seasons.

Roscoe, Paul (University of Maine) and Alice R. Kelley (University of Maine)

[84] *Middens or Monuments? The Shell Middens of Maine and the Construction of Peace*

Although some attention has been given to the possibility that circular, semi-circular, and U-shaped piles of shell in southeastern North America represent monumental architecture (e.g., Thompson and Pluckhahn 2012), little attention has been afforded to the possibility that large shell middens of the eastern North American coast might be monumental constructions. Here, using an argument drawn from New Guinea ethnography, we hypothesize that some Maine middens were not simply rubbish heaps, but conspicuous constructions that, among other things, maintained peace among neighboring aboriginal polities.

Behavioral ecologists theorize that, as honest signals of fighting strength, threat displays and ritualized fighting are information-gathering devices that allow both parties to a conflict to establish the victor without either having to risk the potentially catastrophic costs of serious fighting (Enquist and Leimar 1990). Analogously, we propose, some Maine shell middens were indexical signals of a polity's fighting strength that helped maintain peace by mediating inter-polity conflict. As signals of consumption, scale of feasting, and available food resources, the middens broadcast the number of members and allies a polity could muster, as well as their commitment to its projects. The hypothesis gains support from the distribution of both middens and their contents.

Rose, Alexa and Michael E. Smith (Arizona State University)

[49] *Almenas and Architecture*

Almenas, roof ornaments comprised commonly of ceramic or stone in Teotihuacan that most archaeologists toss aside unknowing of their identity, have been a source of research in archaeology recently after Michael E. Smith and Clara Paz Bauista's paper "Las almenas en la ciudad Antigua de Teotihuacan" in 2015. Continuing Dr. Smith's original research, I have compiled a database of complete almenas from museums and published resources to make new categories for the artifacts. Although many whole almenas are within museums and published sources little is known about their significance. Given the complete roof ornaments, I could reevaluate the pieces Dr. Smith originally studied and give less subjective categories to as well. Then Dr. Smith and I analyzed the information known spatially about the roof ornaments to denote if these almenas truly do, as previously thought, denote building function. Dr. Smith and Paz showed in their paper that almenas were widespread in Teotihuacan and associated with several distinct types of structures. The database of whole almenas permits new hypothesis about how these artifacts signal functions continuing with Dr. Smith's work. This research will assist in defining building function and give clearer categories to these artifacts to aid future archaeologists.

Rose, Courtney [72] see Sezate, Adam

Rose, Katherine (Harvard University)

[40] *Legitimizing Nearness: Negotiating Identities in the Spatial Design of 25th Dynasty Nubian Cemeteries*

Ancient Egypt is characterized as a highly centralized and dominating state. However, following the disintegration of the New Kingdom in the 11th century BC, division of state and conquests by foreign rulers ushered in a period of economic decline and political instability. The fracturing of dominion continued until the 8th century BC, when the Nubian kingdom of Kush unified Upper and Lower Egypt into the geographically largest empire since the New Kingdom. The Nubian pharaohs began construction of necropolises near the Fourth cataract of the Nile. While Kush material culture in the form of royal statuary and temple architecture indicates a reaffirmation of classical Egyptian practices, what is the relationship between Nubian and Egyptian royal identity on a landscape level? This research represents a study of the design and utilization of space in mortuary landscapes of the Nubian pharaohs. This project focuses on spatial analyses of the sites of El-Kurru, Nuri, and Gebel Barkal. The Kushite kings deliberately appropriated the Egyptian architectural symbol of the pyramid and other styles in the construction of royal mortuary landscapes. However, the formation and maintenance of royal identity manifested differently in the design and utilization of built landscapes, across the various periods.

Rose, Nicole (The Graduate Center, CUNY)

[196] *Corroded but Enduring: On the Perpetuation of a Scholarly Iron Curtain in Western Archaeological Thought and Practice*

Archaeological schools of thought vary between countries, with the discipline growing along disparate theoretical trajectories dependent on the historical particulars of a nation's academic traditions. Often distance between such diverging theoretical trajectories is mitigated by communication and collaboration across borders between scholars. However, the Cold War that divided Western and Soviet nations geographically, politically, and culturally also applied to archaeological research, as the flow of information and people across borders was stifled. Despite the collapse of the Soviet Union in 1991 and the mostly normalized relations that developed afterwards, a scholarly Iron Curtain has remained, diminished but enduring. Though certainly not as rigid as decades past, such a divide is visible in the limited number of American scholars conducting research in modern Russian, and in the exclusion of Russian research from our narratives about the prehistoric and ancient past. This paper examines the legacy of the Cold War in American archaeology, specifically in relation to the marginalization of Russian archaeological phenomena in our popular narratives. Ultimately, the peripheralization of these phenomena and regions does not result from anything that existed in pre- or ancient history, but in the modern political and cultural context's shaping of archaeological thought and practice.

[196] *Chair*

Rosen, Arlene [259] see Dawson, Emily

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Rosencrance, Richard (University of Nevada, Reno)**[47]** *New Data and Potential Pathways of Paleoindian Exploration in the West Virginia Highlands*

Comparatively few Paleoindian artifacts have been found throughout the Appalachian Highlands, especially in the uplands of West Virginia. Lack of professional research in West Virginia appears to be the leading cause for this paucity of data. A literature review and newly identified artifacts from surface collections provide a baseline for future research questions and survey strategies. Most artifacts derive from the Ohio and Kanawha river valleys, but new artifacts from the most mountainous portions of the state suggest that early groups also utilized interior river valleys and uplands. The Tygart and Greenbrier valleys are the largest of these interior river systems, and are most accessible by following waterways out of the lower elevations of the Ohio valley to the west. This research identifies high probability areas for Paleoindian sites in the West Virginia highlands based on artifact distribution, topography, hydrologic systems, and lithic raw material sources.

Rosenfeld, Silvana (University of South Dakota) and Megan Street (University of South Dakota)**[335]** *The South Coast and Yungas as Seen from the Highlands during the Middle Horizon*

In this presentation we will discuss different non-local materials recovered from the Wari site of Conchopata and the imperial capital of Huari to better understand the interactions between costa, sierra, and selva during the Middle Horizon. The mapping of the origins of exotic material recovered at these sites will help us understand and better characterize how people in these regions were interacting with each other. By exploring least-cost pathways, among other criteria, we will make inferences on the possible exchange routes used in a diverse landscape marked by many topographic changes during this important time period.

Rosenswig, Robert (University at Albany)**[109]** *Is the Study of Ancient Money Really So Difficult?*

The difficulty that many economists and anthropologists have with studying ancient money lies with inadequate understanding of modern monetary systems. I briefly review the establishment of two currencies: the British pound in the 18th century and the US dollar in the 19th and why the establishment both currencies were political (not economic) constructs. Modern Monetary Theory (MMT) economists analyze the current fiat currencies as political constructs and David Graber's *Debt: The First 5000 Years* provides a historical perspective that undermines classical and neo-classical economists' assumptions of the subject matter. Most discussion by both economists and anthropologists are limited to written accounts. Therefore, I next turn to our ability as archaeologists to investigate money in Prehistoric contexts and employ the Formative-period kingdom of Izapa (800–100 BC) and the early cities on the Pacific coast of Mesoamerica as forum for this to be done.

[262] *Discussant*

Rosenthal, Jeffrey [44] see Morales, Jessica

Rossi, Franco (Boston University)**[110]** *Monuments that Weren't: Reckoning with Unmarked Histories of Violence*

With recent events in the United States, monuments and their powerful implications have been widely covered across media outlets. Less often considered, however, are the monuments that were never built in the first place. This paper grapples with these questions archaeologically, ethnographically and historically by considering monuments and memory through extremely well-explored cases in Bavaria and through other far less discussed cases in the Northeastern U.S. It considers the historical narratives that American public school students grow up learning in relation to monuments and material markers, and discusses potential pedagogical approaches for exploring histories of monuments that never were. Drawing from Indigenous theories of settler colonialism, it seeks to probe possibilities for how future memory work might be envisioned as part of archaeological teaching and public engagement.

[110] *Chair***Ross-Sheppard, Callan (McGill University)****[246]** *Discussant***Rostain, Stéphen (PhD. National Center for Scientific Research, France)****[116]** *Upano, an Anthropized Valley in the Upper Amazon*

Sangay, Ecuador, is probably the most prestigious and impressive site in Amazonia. It is indeed an immense establishment regrouping dozens complexes of artificial earthmounds and a network of endless paths dug along the edge of a terrace of the left bank the Upano. Many archaeological sites have been found in this narrow and straight Upano Valley has been modified over tens of kilometers in length by the pre-Columbian, but few of them have been excavated. Does this multitude of interconnected sites correspond to a central power or a swarm of small local chiefs? This presentation will show the main types of monumental modifications, their chronology from the Formative period to the European conquest and the assumptions that can be made on the pre-Columbian societies that carried out these earthworks.

[116] *Chair***Roth, Barbara (UNLV)****[122]** *Ash Matters: The Ritual Closing of Domestic Structures in the Mimbres Mogollon Region*

Throughout much of the Southwestern U.S., ash was an important component of ritual deposition and has ethnographically been closely associated with processes of cleansing and renewal. The presence of ash in ritual contexts is well documented, but it also appears to have played an important role in the closing of domestic structures. In this paper, I present cases of ritual closure of domestic structures and examine the role that ash played in these closures using data from pithouse sites in the Mimbres region of southwestern New Mexico. These data show that ash was an important component of the abandonment and closure of domestic structures throughout the Pithouse period. I explore the reasons for the use of ash in these contexts and the relationship between domestic and ritual closure during the Pithouse period.

[317] *Moderator***[122]** *Chair*

Roth, Barbara [325] see Baustian, Kathryn

Rotman, Deborah (University of Notre Dame)**[220]** *Collective Labor, Communal Lives: Social Dynamics of 19th-Century Rural Life in Northwest Co. Mayo, Ireland*

Nineteenth-century tenant families on the Bingham Estate and throughout rural Ireland resided in cottage clusters known as clachans, nucleated groups of farmhouses, where land-holding was communal and often had considerable ties of kinship. These settlements were intimately associated with rundale farming, a system of cooperative or collective agriculture. This system was a sophisticated response to specific ecological conditions.

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Lands within infields, outfields, and commonage were allocated so that each household received a proportionate share of productive and non-productive land. Thus, each community was highly adapted to its unique environmental niche. These settlements were also highly complex social

organisms. Children kept cattle away from the gardens, cut and planted potatoes, and gleaned fields where grains were harvested. Women provided for the children, carded and spun wool, and tended to the household. Men were responsible for the management of farm lands. Thus, activity within each clachan and rundale was shaped by gender and age. Although maligned as 'backwards' and 'primitive,' clachans were in fact well-orchestrated socio-economic systems that distributed the risk of agricultural production among its members. This paper explores the social dynamics of these fascinating gendered landscapes.

Rowan, Yorke (University of Chicago) and Austin Chad Hill (Dartmouth College)

[4] *Droning On: UAV Survey in the Black Desert of Jordan*

In this paper we discuss preliminary results of UAV-survey in one area (c. 32 sq. km.) along the Wadi al-Qattafi, Jordan as part of the larger Eastern Badia Archaeological Project. Excavation and survey in this area of the Black Desert revealed hundreds, or possibly thousands, of unmapped and unrecorded structures that required a new approach to their accurate identification and documentation. With the exception of the large desert 'kites' (hunting traps), most stone structures are too small to map effectively using satellite imagery, and too sparsely distributed to map efficiently with traditional terrestrial survey tools. Our results reveal new insights into the distribution of kites, buildings, and other structures in this area. In addition, we note how this mapping project will affect our future research directions, and the challenges drones present for documenting the cultural landscape in this remote region.

Rowe, Ann (The Textile Museum, George Washington University)

[139] *Reconstructing the Inca Occupation Period in Chancay*

Comparatively little excavation information is available from the Chancay valley, particularly pertaining to textiles, which are abundantly preserved there. Yet, it turned out to be possible to identify in museum collections, including that of the NMAI, two distinct styles of highland tunics found at sites in the mid and lower Chillon valley and vicinity that in turn influenced mid-valley and coastal tunics, particularly Chancay-style examples. Moreover, textile designs made it possible to date these tunics to the Inca-occupation period. The identifications were based on technical analysis and the use of site provenience information as well as design comparisons. The conclusions were subsequently confirmed by textiles in a grave lot from the Chancay valley excavated in 1904 by Max Uhle, kept in the Hearst Museum of Anthropology in Berkeley, whose ceramics show no Inca influence. The tunics reveal that people from the upper valley in Chillon probably had some administrative role during the Inca empire in Chancay, and that textiles reflected the imposition of the Inca administration in Chancay to a much greater extent than ceramics.

Rowe, Marvin [74] see Blinman, Eric

Rowe, Sarah (University of Texas Rio Grande Valley)

[196] *Periphery and Perspective: The View from Late Prehispanic Coastal Ecuador*

The small country of Ecuador is sometimes categorized as part of the Andean cultural region and sometimes included in the Intermediate Area. Located as it is next door to archaeological behemoth Peru, Ecuadorian archaeology has frequently been overshadowed by that of its neighbor. Banal oversights, such as maps that show the Inca Empire stretched across the Ecuadorian coast, serve to emphasize the subordinate position of archaeology in the country to the north. Periphery, however, depends on perspective. The central role of ancient Ecuadorian trade networks in supplying the rare materials required for ritual and social life (*Spondylus* shell, specifically) is often acknowledged but rarely examined. In this talk I explore the historical subordination of Ecuadorian archaeology, and outline what may be gained by centering the archaeology of coastal Ecuador within larger archaeological and anthropological discourses. Specifically, I outline the novel forms of social organization that characterized the late prehispanic Manteño tradition, and examine the potential of these forms to rethink and enrich our understanding of other societies in the region.

[324] *Discussant*

Rowley, Rex [116] see Erickson, Clark

Roy, Natasha [167] see Woollett, James

Royster, Thomas [90] see Manzano, Bruce

Rozier, Kristen [265] see Mazow, Laura

Rubin de Rubin, Julio Cezar [2] see Silva, Rosicler

Rubinstein, Emily [224] see Elfström, Petra

Ruby, Bret (National Park Service, Hopewell Culture National Historical Park), Friedrich Lueth (German Archaeological Institute), Rainer Komp (German Archaeological Institute), Jarrod Burks (Ohio Valley Archaeology, Inc.) and Timothy Darvill (Bournemouth University)

[190] *Revealing Ritual Landscapes at Hopewell Culture National Historical Park*

Hopewell Culture National Historical Park preserves six monumental mound and earthwork complexes in south-central Ohio. Archaeological attention in the 19th and 20th centuries remained narrowly focused on mounds and mortuary contexts, ignoring the vast spaces between the monuments. At the same time, agricultural plowing steadily eroded the above-grade features. Recently, the National Park Service forged an international partnership to conduct high-resolution, landscape-scale geomagnetic surveys in collaboration with the German Archaeological Institute, SENSYS GmbH, Bournemouth University, and Ohio Valley Archaeology, Inc. This poster presentation will present highlights from the nearly 500 ha surveyed, along with the results of targeted ground-truth excavations. These investigations are revealing subsurface landscapes of unexpected integrity and complexity, marked by ditched enclosures, wooden post circles, communal earth ovens, and other previously unknown ritual architecture.

Ruhl, Donna (Florida Museum of Natural History)

[89] *Isotopes & Curation: New Lessons Learned from Legacy Waterlogged Wooden Artifacts*

A pilot study was conducted to test the feasibility of applying strontium isotope analysis to source the origins of archaeological "canoe trees" tested to make pre-contact dugout canoes spanning some 5000 years. Many canoes collected decades ago from Florida's lakes produced unexpected signatures. These results raised further questions about the methods' feasibility and the impact of past preservation approaches to the curation of waterlogged wooden artifacts. The anatomical nature of wood cells from legacy samples along with modern proxies was analyzed and experiments indicate the highly hygroscopic nature of wooden log boats/dugouts/canoe trees. New considerations regarding these "wooden sponges" and the potential preservation/conservation for these unique waterlogged remains and the isotopic research will be the focus of this presentation.

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Ruhl, Erika (University at Buffalo) and Sanna Lipkin (University of Oulu)**[25]** *Though we walk through the valley of the shadow of death: Co-burials and Identity in Pre-modern Northern Finland*

This paper specifically addresses the cultural construction of children's age and identity by examining the textiles and burial clothing from a series of pre-Modern mummified children's burials recovered from beneath church floors in northern Finland.

During the pre-modern era, children's burials in pre-modern Finland take one of three forms: (1) alone, in individual coffins (2) in association with other burials but still in their own coffin (3) co-burial, in the same coffin as others. This project specifically considers the temporal, geographic, and religious variations which impact these burials.

Pre-Modern Finnish identities; of "child" and "adult", "male" and "female" are explored through the detailed analysis of the garments with which these children were interred. This also offers the opportunity to consider what childhood meant vis-a-vis adult society, particularly in cases of co-burial. The roles to into which children were enculturated, and the unique boundary between "dead" and "alive" are explored through role identity theory, socialization theory and material and technological choice in the funerary textiles and manner of burial.

Ruhl, Erika [9] see Lipkin, Sanna

Rumberger, Jacklyn (University of Central Florida), Arthur Joyce (University of Colorado, Boulder), Sarah Barber (University of Central Florida), Stacie King (Indiana University, Bloomington) and Guy Hepp (California State University, San Bernardino)**[306]** *Comparing Isotopic Data for Diet and Mobility of Males and Females in the Lower Río Verde Valley, Oaxaca, Mexico*

This poster presents a comparison of the isotopic data from male and female individuals interred in the lower Río Verde Valley of coastal Oaxaca, Mexico from the Early Formative period, beginning in 2000 BC, to the Early Postclassic period, ending in AD 1100. Our previous work in this region has focused primarily on broad dietary changes through time, focusing little attention on comparisons by sex. Our sample for the present study includes 54 individuals: 31 males and 23 females. These individuals were buried at the sites of La Consentida, Cerro de la Cruz, Charco Redondo, Yugué, and Río Viejo—all of which are located in the lower Valley. With this poster, we aim to fill a gap in previous research by investigating inequality, access to resources, and mobility patterns between males and females. We base our findings on evidence from the study of stable carbon, nitrogen, and oxygen isotopes. Employing a sample that spans nearly three thousand years gives us an opportunity to observe changes and continuities in inequality, subsistence, and mobility over time.

Runnels, Curtis (Boston University)**[200]** *Discussant***Running, Garry (University of Wisconsin-Eau Claire)****[182]** *Sand, Rivers, Glacial Lakes and the Prairie-Forest Border: A Doc Holliday Student Heads North*

In this paper I link ongoing research along the eastern shore of Glacial Lake Agassiz (GLA) to Doc Holliday, the person who made it possible. Doc instilled in his students an interdisciplinary mind-set, and taught them to emphasize archaeological questions first and to consider past human groups as active agents of paleoenvironmental change as well as sophisticated responders to it. My research up North began where the ancestral Sheyenne River entered GLA from the west. After patient mentoring from Doc, results of that work suggested that such geomorphologically complex places are, in turn, ecological complex, exhibiting a tight mosaic of ecotones and microhabitats that provided a rich resource base attractive to prehistoric peoples. Later, the interdisciplinary SCAPE project (Study of Cultural Adaptations in the Prairie Ecozone project), was organized to apply that Holliday-inspired model. Doc's model was fruitfully applied in many localities along the prairie-forest border, from Alberta to Manitoba. Now, twenty-six years later, and once again working along the shores of GLA, I am introducing a new generation of researchers to the Holliday way of doing things, from his interdisciplinarity and generosity to students and colleagues, to his singular lunch menu and use of movie lines for field communication.

Ruscillo, Deborah (Washington University in St. Louis)**[298]** *Hunting the Helmet: Social and Practical Aspects of Building a Boar's Tusk Helmet*

From the earliest occurrence of the boar's tusk helmet from Grave Circle B at Mycenae (ca. 1650BCE) to the latest from a sub-Minoan tomb from the North Cemetery at Knossos (ca. 1000BCE) presents a span of 650 years of reverence for this important accessory of Bronze Age warriorhood. Depictions and copies of this helmet in other cultures, including in the Hittite, Egyptian, and even later Roman cultures, demonstrate its pervasive and deeply respected meaning. Helmets of this kind were known to have been passed down through generations and even stolen and gifted. Homer describes one helmet being passed through seven hands before finally ending up on the head of Odysseus. All this raises the question of why warriors did not make their own helmets. What was it about the production and ownership of these helmets that was so special? Why did this type of helmet develop a romantic and timeless reputation in art and stories? The assemblage of broken tusk refuse from Iklaina provides a unique opportunity to explore the techniques involved in the making of a helmet. Microscopy of tool marks and experiments on modern tusks will embellish the information we have on how the illustrious helmets were made.

Rush, Laurie [332] see Schulz, Margaret

Russ, Jon [86] see Colclasure, Cayla

Russo, Michael [34] see Bissett, Thaddeus

Russell, Morgan [254] see Dedrick, Maia

Russell, Nerissa (Cornell University)**[121]** *Guardians in Life and Death: Dogs at Neolithic Çatalhöyük and Beyond*

Dogs often occupy a spiritually ambiguous position in human-animal relations. Domestic but not livestock, they typically share human space and diet more than most herd animals. They are more likely to be considered persons, with souls—a trait they share with wild animals. Here I examine the spiritual status of dogs in early Near Eastern herding societies, as livestock-keeping spread through the region and it became possible to situate dogs in relation to other domestic animals as well as wild ones. I rely primarily on data from Çatalhöyük in central Anatolia, where I have extensive contextual information, supported by patterning from other PPNB/early Pottery Neolithic sites. Drawing on the contextual analysis of animal bones, burial practices, and animal representations, I argue that dogs were not regarded in the same way as wild animals, but that they held greater spiritual power than domestic sheep and goats. This power is evident through taboos: on human consumption of dogs, and on dogs entering occupied houses. However, dogs lived near specific houses, and in death their primary role was the protection of houses and their dead human inhabitants, rather than of individual humans.

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Rutecki, Dawn (Grand Valley State University)**[81]** *Movement and Places Between: The Power of Raccoons*

Informed by ethnographic accounts, iconography has helped clarify how people materialized otherwise intangible aspects of their realities. In this paper, I examine the use of raccoons in imagery from Mississippian archaeological contexts. By considering placement of independent raccoon motifs in iconographic scenes, as well as raccoon motifs associated with figures, I identify use patterns of raccoon imagery. Considering these iconographic data alongside faunal data generated from Spiro, Oklahoma, I argue that associations between raccoon motifs and other images, such as the Striped Pole Motif, suggest that raccoons may be associated with movement between the Middle World and other places. In addition, I suggest that considering possible links between the ability to access or wield this power materialized through use of raccoon bindings in various scenic constructions provides an opportunity to center indigenous ontologies in interpretations of material culture.

Rutherford, Cady [18] see Cortes-Rincon, Marisol

Rutkoski, Ashley (Kent State University) and Michelle Bebbler (Kent State University)**[301]** *Assessing the Distribution of Limestone Temper in Southern Ohio*

The earliest known occurrence of limestone temper usage in Ohio began sometime during the Middle Woodland Period, and becomes common in Late Woodland cave sites in the southern part of the state. However, little is known about the overall temporal and geographic distribution of this temper type. Toward this end, we analyze pottery throughout the southern Ohio Woodland period by assessing it with hydrochloric acid (HCl) for the presence or absence of limestone. The results of this examination have relevance for understanding the broader adoption of limestone temper.

Rutkoski, Ashley [44] see Eren, Metin

Ruvalcaba, Jose Luis (Instituto de Fisica UNAM), Paulina Guzmán (Instituto de Fisica UNAM), Edgar Casanova (Instituto de Fisica UNAM), Miguel Angel Maynez (Instituto de Fisica UNAM) and Isaac Rangel (Instituto de Fisica UNAM)**[293]** *Technical Examination of Mural Painting Fragments from Plaza of the Columns Complex of Teotihuacan: A Comparative Study*

The discovery of numerous Maya-style mural painting fragments during the archaeological excavations in the Plaza of the Columns Complex of Teotihuacan, sprouted debates concerning if these murals were drawn by a Maya artist. In order to compare the pigments composition and the pictorial technique of these paintings with mural paintings from the Maya area from the Classic Period, a non-invasive characterization of the thin ground layer of stucco and the pigments used in the painting discovered in Teotihuacan was carried out. The color palette shows red, yellow, blue, green, black and white pigments. First a False Color Infrared Imaging method combined with Optical Microscopy was used to contrast the pigments. Afterwards, several spectroscopic non-destructive techniques (X-ray fluorescence, Fiber Optic Reflectance and Raman Spectrometries), as well as Scanning Electron Microscopy (SEM-EDS) were applied for pigment identification. The main results of this comparative study are discussed in order to understand the degree to which local or non-local pigments were utilized by the artist in question.

Ruvalcaba, Jose Luis [89] see Lozano Bravo, Hilda

Ryan, Christopher (Vandenberg Air Force Base), Rick Bury (Rock Art Documentation Group), Jon Picciuolo, Antoinette Padgett (Rock Art Documentation Group) and Dan Reeves (Rock Art Documentation Group)**[214]** *Illuminating Event-Based Significance at Three Rock Art Sites on Vandenberg AFB, CA*

Although we now have highly technical equipment that allows analyses and observations of rock art in new ways, this should in no way diminish pursuing our personal sense of curiosity, ability to develop hypotheses out of hunches, and test those hypotheses as best we can, to discover layers of significance for a rock art site that no piece of equipment would ever be capable of detecting. One such area of inquiry is consideration of ephemeral, event-based ways rock art interplays with the surroundings—the way rock art may have been created against a backdrop of specific environmental conditions—in some cases conditions that are unique and clear, in other cases seemingly undistinguished. Discoveries may come slowly while a hypothesis is tested under various conditions. There are some obvious starting points—solstice and equinox, for example—but even then the opportunity for discovery comes but once a year. Three rock art sites on Vandenberg AFB, California, have pictographs and petroglyphs that were created in interplay with either sunrise or sunset during Winter solstice. This paper discusses the interplay at each site and the methods used to document these events.

Ryan, Ethan**[239]** *Chipping Away through Space and Time: A Macroevolutionary Approach to Household Spatial Organization*

Archaeological investigations at Housepit 54 within the Bridge River site have exposed seventeen discreet floors primarily dating to ca. 1500–1000 cal. B.P. In this poster, we draw data from a subset of the site's floors in order to address questions about the potential spatial and temporal relationships between the patterning of hearth-centered activity areas by primarily examining variability in lithic artifacts. Faunal remains and other features will also be included in analysis. Using the same methodological and theoretical approach for each floor, we examine feature form and function, lithic tool production and maintenance, animal and plant processing, taphonomic processes, and potentially, ritualistic practices in order to reconstruct the means by which the items within each activity area came to be co-associated. From these studies, we draw conclusions regarding the functional uses of these spaces on the house floor and their relationship over time. We then seek to address potential relationships between activity areas by the application of the ArcGIS spatial analysis toolbox and the examination of inter-assemblage variability. Results of this research permit us to develop a range of implications regarding household occupational history and sociality.

Ryan, Ethan [97] see Super, Clare

Ryan, Susan (Crow Canyon Archaeological Center)**[122]** *Sequencing Termination Events: Preparing Hearths for the Ritual Decommissioning of Ancestral Pueblo Pit Structures in the Northern U.S. Southwest*

With the development of a detailed contextual archaeology, we have gained the ability to identify how termination behaviors are related by subtle linkages in time and space. Individual actions that take place within the various portions of a structure are temporally distinct events, but are contextually related via ultimate decommissioning objectives. Each individual behavior qualified the meaning of those that preceded or followed it. Using multiple ancestral Pueblo sites in the Mesa Verde region dating to the Pueblo I–Pueblo III periods (A.D. 750–1280), this research examines how pithouse and kiva hearths were ritually prepared prior to the termination of the structure as a whole. Various preparatory behaviors identified include filling hearths completely with ash, placing material culture on and within hearth ash, and placing hatch covers over hearths prior to roof collapse. The

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timing of distinct decommissioning events is an important factor in determining the duration of the termination period as well as the order and nature of decommissioning behaviors.

Rybin, Evgyny [41] see Gillam, J. Christopher

Ryker-Crawford, Jessie

[337c] *Moderator*

[60] *Discussant*

Ryzewski, Krysta (Wayne State University)

[201] *Discussant*

Saban, Chantel [38] see Cromwell, Richard-Patrick

Sabatino, Giuseppe [85] see Iovino, Maria Rosa

Sabin, John (Florida State University) and Austin Cross (Florida State University)

[102] *Predictive Modeling of Paleoindian and Archaic Sites across Florida with GIS*

Florida's terminal Pleistocene and early Holocene archaeological sites form interesting settlement patterns when projected upon various geographic representations. Probably many unknown Paleoindian and Early Archaic sites still remain hidden and unstudied, as more than half of Florida's landmass was inundated during these cultural periods. Due to constraints in visibility and access, the practical limits of traditional survey hinder progress in discovering additional sites around the state. With the advent of geographic information systems and its spatial statistics capabilities, researchers working in the area are able to utilize remote-sensing as well as other techniques to uncover new sites. In addition, predictive models can be created through the incorporation of LiDAR scans available through state databases correlated with existing spatial data. These allow for novel displays of the archaeological landscape in Florida. Conventional methods in both terrestrial and underwater excavation and mapping can now be bolstered via the aid of GIS to get a more complete picture of Paleoindian and Early Archaic settlement patterns in the coastal plains of the American Southeast.

Sabin, John [102] see Cross, Austin

Sabloff, Jeremy (Santa Fe Institute)

[1] *Discussant*

Sabloff, Paula

[25] *The Political Agency of Pre-modern State Royal Women*

Royal women—queen consorts and princesses—were pawns in rulers' marriage game. But once established in their husbands' courts, they exhibited political agency through several means, e.g., spying, ruling in their husbands' or sons' stead, participating in the usurpation of the throne, etc. They were able to do so partly because of their position, which gave them access to power, and partly because of their ability to accumulate wealth, which enabled them to become patrons in their own right. This presentation defines agency in pre-modern societies and shows how royal women in eight pre-modern societies (from Old Kingdom Egypt to the Aztec Empire) exhibited similar patterns of agency.

Saenz Serdio, Martha Adriana and Mikaela B. Razo (Georgia State University)

[330] *Los montículos de Conil: Excavaciones recientes en la costa norte de Quintana Roo, México*

El Proyecto Costa Escondida, quien a través de un equipo interdisciplinario dirigido por los doctores Jeffrey Glover y Dominique Rissolo ha explorado la costa norte de Quintana Roo desde el año 2005, excavó en su temporada 2017, dos montículos del sitio llamado Conil; este es uno de los dos asentamientos más grandes registrados en la costa norte involucrados en cierta medida, en el comercio costero de la época prehispánica. Las estructuras presentan distintas formas, tamaños y técnicas constructivas, las cuales son nuevas evidencias contextualizadas sobre la temporalidad y las características del sitio. Los artefactos asociados recuperados como cerámica, lítica, concha, restos óseos animales y humanos permitirán en estudios posteriores, hacer comparaciones con el cercano sitio de Vista Alegre, excavado por el mismo proyecto durante el año 2016, para así explicar el papel que tuvieron estos sitios durante los periodos Formativo Medio al Posclásico.

Sagripanti, Jose-Luis (RETIRED US Army), Dan Wise (Edgewood CB Center, U.S. Army), Ralph A. Anthenien Jr. (Propulsion and Energetics, U.S. Army), Elias Yoon (Edgewood CB Center, U.S. Army) and Christopher Kleihege (Zona Arqueologica Caral, Peru)

[46] *High Energy Generation and Elevated Temperature Potential of an Archaic Furnace in Ancient Peru*

We present an aerodynamic and thermal study of the architectonic complex including a fire pit (locally named Fogon Mayor) on top of the largest pyramid in Caral, a society that flourished between 2627 and 2020 cal B.C. near the Pacific coast of present day Peru. The air flow produced by wind on the corridor and ducts feeding the fogon was estimated by various engineering approaches that agreed (within 7–18%) with calculations obtained by fluid-dynamics-modeling of the whole pyramid. Results were validated by measuring wind gradient along the pyramid in Caral and by testing a scale model of the complex in a wind tunnel. The air flow produced by wind harnessed in the corridor and ducts was in remarkable agreement with the required for complete combustion of wood loads in the fogon. Thermal analysis indicates that after reaching steady state, combustion in the fogon would have produced between 95 KW and 350 KW at an operational temperature above 1120oC and likely between 1180 and 1350oC. This temperature range was confirmed by nondestructive spectrographic analysis of ancient burn samples in the walls of the fogon. The remarkable sophistication of the complex will be discussed from an engineering perspective.

[46] *Chair*

Saitabau, Henry [99] see Hu, Lorraine

Sakaguchi, Takashi

[45] *Regional Sociopolitical Transformations among Complex Hunter-Gatherers: A Macroregional Approach to the Late Jomon of Central Hokkaido*

This paper presents a new perspective on the study of the emergence of shuteibo (a type of communal cemetery enclosed by a circular embankment constructed during the Late Jomon) by employing a macroregional approach combining several analytical dimensions: 1) settlement pattern, 2) site scale, 3) household, 4) burials, and 4) interaction. This approach is crucial to understanding the sociopolitical evolution of community organization and

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status variability involved in the emergence of the communal cemetery. All of the evidence from the analyses suggests that the emergence of the communal cemetery appears to be tied to the dramatic changes in mortuary practices, economic systems, household organizations and settlement patterns during the latter half of the Late Jomon of central Hokkaido. These factors were also intimately related rather than being isolated factors represented by static models.

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Sakai, Sachiko (California State University Long Beach)

[164] *Changes in the Sources of Olivine-Tempered Ceramics and the Social Interaction Patterns among the Virgin Branch Ancestral Pueblo*

Various forms of social interactions seem to have been adopted as risk-buffering strategies in the marginal agricultural environment of the Virgin Branch Ancestral Puebloan region. The olivine-tempered ceramics are widely distributed in this region and the sources of olivine are in the highlands near Mt. Trumbull and Tuweep. Thus, the presence of olivine-tempered ceramics in the lowland Virgin area indicates economic and social ties between the highland and lowland populations. This ceramic compositional study using LA-ICP-MS suggests that the sources of the olivine-tempered ceramics found in the Mt. Trumbull and the lowland Virgin areas are not only in Mt. Trumbull but also in the lowland Virgin area, with the latter production centers having used olivine from Mt. Trumbull. The study also suggests that some of the olivine-tempered ceramics made in the lowland Virgin area were moved back to Mt. Trumbull. In this study, I explore the mechanisms of social interactions that moved olivine-tempered pots within various areas. In particular, I address the question of whether olivine-tempered ceramics were transported as a result of trading or human migration in various time periods. To answer this question, ceramic compositional data will be combined with optically stimulated luminescence (OSL) dating.

[164] *Chair*

Sakai, Sachiko [164] see Buck, Paul

Salazar, Diego [34] see Flores-Fernandez, Carola

Salazar, Julian (Universidad Nacional de Cordoba—CEH Segreti—CONICET), Valeria Franco Salvi (ISES CONICET—Universidad Nacional de Cordoba) and Dana Carrasco (Universidad Nacional de Cordoba)

[295] *Multiple Temporalities in the Andean Eastern Piedmont (Tucumán Province, Argentina).*

New perspectives from social archaeology have recently addressed the constitution of early village landscapes in the Northwest of Argentina. These new ideas have recognized the existence of multiple temporalities rather than the unilinear historical development of cultures or settlements conceived by previous normative and processual approaches. This dissertation will discuss the relevance of multi-temporal perspectives in order to understand social and political transformations in the long term process and the reproduction of social practices in the microscale, emphasizing the role played by ancestor veneration. Furthermore, we are interested in the diversity of material features in which ancestors were represented (e.g. cist tombs, huancas or menhirs, figurines, sculptures) with the purpose of generating measurable and testable data about this kind of archaeological record.

Salazar Chavez, Victor Emmanuel (The George Washington University), Cuauhtemoc Vidal-Guzman (Formative Etlatongo Project) and Jeffrey Blomster (The George Washington University)

[288] *The Materiality and Creation of Constructed Space at Etlatongo, Oaxaca, Mexico*

This paper explores the ontological relationality between humans and the creation of space during the Cruz B phase (1200/1150–850 BC) in the late Early Formative Etlatongo, in the Mixteca Alta of Oaxaca. In particular, we focus on how the use of bedrock afforded the construction of a 'lived' place. By looking at the materiality of its intrinsic properties, we argue that the Mixtecs of Etlatongo intentionally used bedrock as part of construction episodes in the formation of a public space so that its symbolic properties were able to emerge with the building's form and history. Considering that ethnographic accounts mention that Mixtecs understood reality as an indivisible whole animated with sacred life forces, we examine the ways in which this existential unity manifested during construction events and through the life histories of buildings; we link our Cruz B example with ethnographic practice through subsequent construction episodes at Etlatongo that illustrate the abiding interest in certain attributes of bedrock. Furthermore, we contemplate how the relational co-constitution of sediments, structures, and humans afforded the articulation of new relationships during the formation of Early Formative Etlatongo.

Saldana, Marie (Rice University)

[40] *Procedural Modeling for Archaeology*

The archaeology of landscapes and cities produces large quantities of data that presents a challenge to visualization. Libraries of procedural scripts or "rules" can help to streamline the process of modeling built environments and their topographical contexts, by identifying typical elements that can be adapted to empirical data through the modification of parameters. One of the advantages of procedural modeling as opposed to other types of archaeological visualization is that it allows for the rapid prototyping of many different iterative versions of a model, thereby allowing researchers to test different theories and present many different hypotheses side by side. A second advantage is the ability to connect, line by line, the code or "rules" that generate the models with source data and process documentation. This paper presents projects that use procedural methodology for archaeological reconstruction of cities, landscapes, and individual buildings.

[320] *Discussant*

Saldana, Melanie (California State University Los Angeles), James Brady (California State University Los Angeles), Robert Schmittner (Gran Aquifero Maya), Cristina Verdugo (University of California Santa Cruz) and Guillermo De Anda Alaniz (Instituto Nacional de Antropología e Historia)

[134] *Balankanche Revisited: Some Preliminary Observations*

With the discovery of passages sealed behind a blockage in 1959, Balankanche became the preeminent cave in Maya archaeology. Because so many of the intact vessels were incense burners and because of the Maya ceremony recorded as part of the investigation, Balankanche's ritual function was never questioned even though at that time most caves were thought to be habitational. E. Wyllys Andrews IV's monograph on the cave has remained one of the field's best reports.

In the summer of 2017, the Gran Aquifero Maya explored Balankanche in hopes of mapping additional underwater passages. While such passages

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have not yet been located, our investigations have made it quite clear that our knowledge of this cave needs to be updated in light of advances in cave archaeology over the last 50 years. These advances are most acutely apparent in the recognition of ritual features overlooked in the previous study as well as revealing a cave much larger and extensively utilized than previously reported. Based upon these preliminary observations, a more thorough restudy is recommended.

[157] *Chair*

Salem, Rebecca (University of Nebraska—Lincoln) and Effie F. Athanassopoulos (University of Nebraska—Lincoln)

[70] *Archaeology and Tourism in the Early 20th Century: Pompeii through a Photographic Archive*

Since its rediscovery in 1748, Pompeii has remained a destination for travelers and tourists from around the globe. Originally, a tourist destination during the Grand Tour, mainly in the 17th-18th centuries, Pompeii attracted the educated elite. In the course of the 19th century, the site was transformed into an open-air museum and became accessible to a broader group of visitors seeking an authentic experience. This presentation offers a glimpse at a tourist's experience in the early 1900s through a private archive of 32 original photographs. This collection of images can provide significant information on the history of archaeological excavation and tourism in Pompeii at the turn of the 20th century. GIS's Network Analysis is used to create a visualization of a route throughout Pompeii based on the locations and monuments captured in the photographs. These images can be correlated with excavation histories to ascertain which unearthened features were observable to visitors and those that were inaccessible—an issue that is of continuing relevance to the present day. Furthermore, souvenirs acquired during the visit suggest that tangible objects played a significant role in the quest of tourists to capture the experience and memory of the site.

[70] *Chair*

Salgado-Flores, Sebastian (University of Texas at San Antonio)

[76] *Prey Choice and Politics: Modelling Postclassic Maya Wood Selection at La Punta, Chiapas, Mexico*

How did Postclassic Maya communities decide which tree species to harvest for firewood and timber in a diverse forest environment? Most studies of ancient tree selection have used the principles of optimal foraging to construct a baseline of expectations for interpreting archaeological charcoal datasets. This paper will explore the implications of such a model on the interpretation of wood charcoals from the site of La Punta in Chiapas, Mexico, while also considering how the political structure of Postclassic Maya society could have influenced the resource gathering behavior reflected in the data. La Punta is one of several contemporaneous Postclassic Maya sites located along the shores of Lake Tzibá'na in the Metzabok nature reserve in Chiapas, Mexico. In 2014, excavations in its public central plaza encountered terminal deposits of charcoal, ceramic, and animal bone. The charcoal from this communal context will be compared to charcoals found in domestic contexts elsewhere at the Metzabok sites to understand if (and how) wood selection strategies varied significantly based on context.

Salgán, Laura (CONICET/ IANIGLA Museo de Historia Natural de San Rafael), Gustavo Neme (CONICET/ IANIGLA Museo de Historia Natural de San), Sergio Dieguez (Museo de Historia Natural de San Rafael, Mendoza,), Paz Pompei (CONICET/ IANIGLA Museo de Historia Natural de San) and Adolfo Gil (CONICET/ IANIGLA Museo de Historia Natural de San)

[9] *Geoarchaeology, Geochemical and Spatial Distributions of the Obsidian Source in Southern Mendoza (Argentina): The Case of Coche Quemado Source*

During the last twenty years, four primary obsidian sources have been recorded in southern Mendoza province. The archaeological record indicates that all were used from the Holocene until pre-hispanic times, however many obsidian artifacts still are assigned to unknown sources. Recent surveys allowed discovery a new obsidian source called Coche Quemado. It is located in the western margin of the lower basin of the Rio Grande, in the Mendoza Andean piedmont. The obsidian from the source appears as nodules of variable sizes and very good quality for the manufacture of tools. The nodules are part of a conglomerate that corresponds to the geological formation Agua de la piedra (Oligocene). In this paper, we present the spatial distribution of the source, the variety of the macroscopic characteristics of the raw material and current trends in the archaeological record. Seventeen samples were analyzed by INAA and XRF by the Archaeometry Laboratory at MURR. The results indicate that the Coche Quemado source has a different geochemical signal than all other sources in the region.

Salisbury, Roderick B. (Austrian Academy of Sciences), Katharina Rebay-Salisbury (Austrian Academy of Sciences), Doris Pany-Kucera (Austrian Academy of Sciences) and Julie Dunne (School of Chemistry, University of Bristol)

[87] *Feeding Vessels in Later European Prehistory*

Small vessels with spouts, from which liquid can be poured, are known from settlements and graves of the European Bronze and Iron Ages. Sizes, shapes and decorations are highly variable, and although they generally fit the period-specific style, they represent a functional type. One explanation for this vessel form is libation—the act of pouring a liquid as a sacrifice to a deity. Recent discoveries, however, reinforce an association with children's graves and suggest a function as feeding vessels for babies and small children. Experimental work has confirmed that it is possible to feed small children with liquid from feeding vessels. In the course of the European Research Council funded project 'The value of mothers to society,' we are currently using GC-C-IRMS to test vessel fragments for organic molecules from liquids that may be preserved in the ceramic matrix. This paper will discuss if and how feeding vessels were used for the care of babies, small children, and the sick, as well as potential health implications of using alternatives to breastfeeding in prehistoric Europe.

[319] *Discussant*

Salwen, Stephanie (University of California, Los Angeles)

[171] *The Agency of Flowing Water in Human Mobility and Interaction*

Water is one of the most powerful agents of change on the planet. Flowing water can build and destroy landscapes rapidly in dramatic fashion as with flash flooding or gradually through incremental natural processes, shaping the terrain through sedimentation, erosion, and seasonal fluctuations in water flow. Within human societies, these waterways may be perceived as a source of danger, but also provide subsistence and non-subsistence resources, and serve as landscape features that alter how people move through the physical world. Though scholars widely recognize the extent to which humans have incorporated flowing water into cultural processes such as for trade, this paper focuses on the idea that waterways introduce possibilities and limitations to which communities respond. I consider several case studies in North America, with a focus on the Northeast and Mid-Atlantic regions, to show that flowing water is not a passive element of the human environment, but an active participant in the creation of physical and social worlds. Flowing water alters human mobility and resultant interaction spheres, particularly during period of significant social and economic transformation such as occurred during the early reorganization associated with early colonial presence along the Atlantic coast of North America.

Samba, Roger [114] see Douglass, Kristina

Samei, Siavash (University of Connecticut)

[217] *Chair*

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Sampeck, Kathryn (Illinois State University)**[271]** *Barrios de mulatos in the Izalcos Region of Colonial Guatemala*

While much scholarship has focused on indigenous-Spanish relationships in the construction of colonial Mesoamerica, a substantial and growing part of the population of colonial settlements were people of African descent. This trend was equally true in the Izalcos region of colonial Guatemala, what is today western El Salvador. This region was a crucial center in the developing trans-colonial economy because of its early leading role in the production of cacao, the tree whose seed is the main ingredient for chocolate. Because of the extraordinary place of the Izalcos in this colonial moment, the region experienced intense social, political, and economic pressures. One expression of colonial anxiety was the development of a social classification system known as castizaje. While some casta terms are part of the sixteenth-century vocabulary, the system of castas was not systematic until the eighteenth century. Censuses and other documentary evidence indicate that discrete barrios in Izalcos region towns were mostly Afro-Central Americans. This paper presents evidence of their material worlds, including spatial arrangements and portable material culture from the sixteenth to eighteenth century, the time of the development of racial ideologies in Spanish America.

[170] *Discussant***[271]** *Chair***Sampson, Christina (University of Michigan)****[81]** *Late Pre-Columbian Craft and Community at the Weeden Island Site (8P1)*

In the past, as in the present, political-economic relationships occur at multiple social scales: for instance, we recognize regional relationships of dominance or tribute, degrees of dependence or rivalry between trading partner communities, and patterns of collaboration or competition between neighboring households. Enduring inequalities may become established at any of these levels at different times. This paper will discuss the local organization of residential communities in the context of the Safety Harbor culture, which occurred on the west-central Gulf coast of Florida in late pre-Columbian times. Early Safety Harbor culture represents a transition from Woodland-period communalism to the hierarchical systems witnessed in the early historic period, though the timing and nature of these changes remains ambiguous. The limited amount of evidence from domestic contexts has made it difficult to understand the degree to which changes in regional settlement corresponded with new ways of managing local relationships. I will focus in particular on recent work at the Weeden Island site (8P1), including evidence for an emphasis on crafting special-purpose shell ornaments and the integration of crafting activities with other aspects of subsistence.

Samson, Alice (School of Archaeology and Ancient History, University of Leicester)**[123]** *When Is Creolization?*

Multiple episodes of identity transformation can be seen in the archaeology of Mona island. From the emergence of "Taino-ness" (cf. R. Rodríguez) in the 12th century, to the catastrophic (after S. Mintz) eruption of colonial identities in the 16th century. We contrast the dynamics and character of creolizations from a diachronic and material perspective by looking at the archaeology of 500 years of subterranean ritual landscapes of Mona. We ask whether an expanded use of the term creolization is useful to challenge the rigidity of concepts such as Taino, indigenous, Spanish, Christian.

[57] *Discussant*

Samson, Alice [283] see Cooper, Jago

Sam-Stanley, Christina [114] see Armstrong, Chelsey Geralda

San Román, Manuel J. (Universidad de Magallanes), Flavia Morello Repetto (Universidad de Magallanes, Instituto de la Patagon), Jimena Torres (Universidad de Magallanes, Instituto de la Patagon), Victor Sierpe (Universidad de Magallanes, Instituto de la Patagon) and Karina Rodríguez (Museo Antropológico Martín Gusinde, DIBAM, Chile)**[155]** *Maritime Hunter-Gatherers from Southernmost Patagonia (South America, Chile): Discussing Occupation Intensity and Resource Exploitation Strategies for the Central Strait of Magellan during the Late Holocene (2500 BP—XVIII Century)*

Maritime hunter-gatherers from Fuego-Patagonia are of special archaeological interest given their sudden emergence in the archaeological record and their highly specialized economic adaptation. In 2011 we carried an intense salvage archaeological excavation program along the central area of Strait of Magellan in Southernmost Patagonia, Chile. Here we present the results obtained from 1.546 m² of excavation, where a total of 18 archaeological sites, located along the eastern shore of the Brunswick Peninsula (south of Punta Arenas), were rescued. The excavations have generated an important archaeological assemblage of materials that provide significant information regarding the human occupations of this region between c. 2500 years BP and the XVIII century.

This study assesses the general characteristics of the occupations in this region, and discusses their technological components (bone and lithic instruments) and the faunal resources exploited. The results obtained are then compared with previous studies in this region. These data are used to discuss the intensity of human occupation in the area, and the role of marine and terrestrial fauna in the subsistence strategies of the maritime nomads from Southernmost Patagonia during the Late Holocene.

San Román, Manuel J. [153] see Belmar, Carolina

Sanchez, Kristie [335] see Lozada, Maria

Sánchez, Guadalupe [155] see Sánchez-Morales, Ismael

Sanchez Miranda, Guadalupe (Instituto de Geología-UNAM/INAH) and John Carpenter (Centro INAH Sonora)**[59]** *Pleistocene and Holocene People of Sonora*

Recent interdisciplinary investigations have revealed that the Sonoran Desert region is not only one of the earliest regions occupied by humans on the American Continent but also has one of the longest occupation records. The earliest Sonorans were proboscidean hunters in the Late Pleistocene, Archaic foragers and hunters in the Early and Middle Holocene and maize farmers in the Late Holocene. Several sites in the state of Sonora, Mexico have a well-preserved archaeological record with stratigraphic deposits that cover the last 15,000 years. Based upon multiple sources of evidence (pedological data, isotopes, pollen samples, macrobotanical remains, diatoms, and cultural material) primarily from the El Fin del Mundo and the La Playa sites; we explore the mobility, social and economic organization of the peoples of Sonora from the Pleistocene to the acquisition of maize.

Sanchez Miranda, Guadalupe [131] see Carpenter, John

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Sánchez-Morales, Ismael (School of Anthropology—University of Arizona), Kayla Worthey (School of Anthropology—University of Arizona) and Guadalupe Sánchez (ERNO—Universidad Nacional Autónoma de México)

[155] *A Gomphothere Kill and a Clovis Campsite: The Clovis Faunal and Lithic Assemblages from El Fin del Mundo, Sonora, Mexico*
El Fin del Mundo is a Clovis site with multiple activity areas located in the Sonoran Desert of Northwest Mexico. The site contains the only gomphothere (*Cuvieronius* sp.)-Clovis association yet known in North America and has produced one of the largest assemblages of diagnostic Clovis stone tools south of the US-Mexico border. Zooarchaeological and taphonomic analyses indicate that Locality 1 preserves the remains of two gomphotheres, aged to approximately 2 years and 8–19 years old, and that the spatial integrity of the site is well preserved. Clovis points and flakes are scattered in and around two bone concentrations, each containing the remains of a single gomphothere. Lithic materials are scattered across the stable upland surface to the south of Locality 1. The lithic assemblage from these uplands includes bifaces, unifaces, and blades. The artifact classes, tool types, and their contexts are indicative of a Clovis camp or camps where domestic tasks took place on the stable uplands surrounding the gomphothere kill.

Sanchez-Tornero, Francisco (Francisco J. Sanchez-Tornero)

[95] *The Use of White Engobe in the Formative Ceramics in Ojo de Agua Spring from San Antonio La Isla, Toluca Valley, Mexico*
In the present research analyzed by Scanning Electron Microscopy (SEM) and Energy-Dispersive X-ray (EDX) the Formative (ca. 1500BC-200BC) ceramics with white engobe, located in Ojo de Agua spring from San Antonio La Isla, Toluca Valley, with the objective of identifying the first manifestations of the use of white engobe and/or dye in a comparative framework and its cultural significance for the lacustrine societies in the studied regions. Micrometric images and chemical data identify fossil diatom structures in the engobe, indicating that it is the raw material used for the elaboration of the white engobe applied to the Formative ceramics in the Alto Lerma basin and the southern basin from Mexico. The chemical-elemental results suggest that the use of the diatom fossil as a dye material was a chromatic tradition rooted in Alto Lerma and in the south of the basin of Mexico, which prevailed in riverside communities for millennia. The similarities and specific variations, recorded in archaeometric information, allow the recognition of the relationship between different human groups, the technique and/or the techniques used, serving as a basis for knowing the cultural legacy that identifies a population group.

Sandberg, Paul [143] see Monroe, Cara

Sandweiss, Daniel H. (University of Maine)

[84] *Discussant*

Sandweiss, Daniel H. [135] see St. Amand, Ani

Sanger, Matthew (Binghamton University)

[156] *Chair*

Sanger, Matthew [156] see Hunt, Rebecca

Sanger, Matthew [156] see Raymond, Tiffany

Santana Sagredo, Francisca (Research Laboratory for Archaeology and the History of Art, University of Oxford), Petrus le Roux (University of Cape Town), Rick Schulting (University of Oxford), Julia Lee-Thorp (University of Oxford) and Mauricio Uribe (Universidad de Chile)

[249] *Travelling across the Atacama Desert: New Evidence for Human Mobility in Northern Chile Based on Oxygen and Strontium Isotopes*
The study of human mobility is key to understanding the social and cultural dynamics of the pre-Columbian groups that inhabited northern Chile's Atacama Desert. Material culture suggests that during the Late Intermediate Period (AD 900–1450) individuals frequently crossed the desert from the coast to the Andes and vice versa. Fish remains have been found in the interior valleys, and inland textiles and crops at the coast. This paper explores mobility in northern Chile through the application of strontium and oxygen isotope analyses on human teeth from several archaeological sites. First we present a local bioavailable strontium baseline for the study area, based on plant and animal remains, which helps to alleviate the scarcity of bioavailable strontium isotope data for northern Chile. Results show that non-local individuals of both sexes were buried in the dispersed cemeteries of Pica 8, Quitor 6 and Los Verdes 1. These results support the idea that varied groups of individuals moved across the landscape, complementing and augmenting the larger discussion on mobility patterns in the Atacama Desert.

Santasilia, Catharina (University of California, Riverside)

[262] *Tlatilco Revisited*

Since Tlatilco was discovered in the 1930s by Miguel Covarrubias, our understanding of the Early Formative site has changed with a steady flow over the last 80 years. During the 1940s, 50s, and 60s Tlatilco was excavated revealing the dynamic of the site, with the objective to establish the chronology and preserve the many burials. There seems to be extensive evidence that Tlatilco in fact was more than a burial site. The established (calibrated) dates for Tlatilco to be between 1200–900 BCE which makes Tlatilco contemporary with many other significant cultures in Central Mexico, including: San Lorenzo and Las Bocas. My research involves gathering iconographic and archaeological data from major collections all over the United States, as a supplement to understand the variation within the material expression of this ancient culture. Through comparative techniques, as well as utilizing advanced laboratory analysis, I am investigating the diversity of the community of Tlatilco and its neighbors. New observations and research has yielded changes to our previous understanding of Tlatilco.

Santiago, Louis [76] see Fedick, Scott

Santoro, Calogero (Universidad Tarapacá, Instituto Alta Investigación, Arica, Chile) and Mauricio Uribe (Departamento de Antropología, Facultad de Ciencias)

[100] *Inca Imperial Colonization and Ethnicity of Northern Chile*

Were the Inca aware of the restrictive possibilities for labor and productivity in the extreme arid territories of the Atacama Desert of northern Chile? How did the Inca officials manage to obtain information that enabled them to identify (i) strategic enclaves for farming, installing administrative and political nodes, exploiting and processing ores, and (ii) a selection of conspicuous mountains to place hilltop shrines? Here we discuss the idea that the rapid, extensive, and efficient expansion of the Inca into northern Chile was not the consequence of random decisions. On the contrary, the three study cases we present, the Zapahuira, Tarapacá Viejo, and Catarpe nodes, show strategic geopolitical decision-making, by reducing conflict of interest for resources and land between foreign polities and local leaders, who were active agents in promoting and facilitating the State programs. Furthermore, by transforming the economic, political, and ideological system, the Inca integrated northern Chile into a pan-continental political and economic network, and ethnic identity through the Qhapaq Ñan, among other mechanisms.

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Santoro, Calogero [86] see Mcrostitie, Virginia

Sanz, Nuria (Head and Representative of the UNESCO Office in Mexico)
[213] *Discussant*

Sara, Cesar (Pontifical Catholic University of Peru) and Eisei Tsurumi (University of Tokyo)

[64] *Renovation of Temples during the Kotosh Mito Phase: 2016 Excavations at Kotosh, Huanuco, Peru*

In the 1960s, the University of Tokyo excavated the archaeological site of Kotosh (department of Huanuco, Peru) and discovered monumental constructions of a ritual character which predate the first appearance of pottery in the region. The superposition of many temples (ritual chambers) suggests that there were repeated architectural renovation events during the Late Preceramic occupation referred to as the Kotosh Mito Phase. However, the chronological position of the Kotosh Mito Phase has been uncertain because the deepest level of the mound was left unexcavated to preserve its important cultural heritage features such as the Templo de las Manos Cruzadas. Furthermore, the intensive alteration by the Early Horizon occupation made the architectural transition from the Preceramic Period to the Initial Period unclear. The authors will present new data from excavations in 2016 of the same mound, aiming to elucidate the complete process of renovation of temples during the Kotosh Mito Phase.

Sara, Timothy [22] see Gollup, Jasmine

Sario, Gisela [154] see Cattaneo, Roxana

Sassaman, Kenneth (Univ of FL—Anthropology), Asa Randall (University of Oklahoma) and Neill J. Wallis (Florida Museum of Natural History)

[122] *The As(h)endant: Cosmological Work of Material Traces of Burning in the American Southeast*

Archaeological contexts of the American Southeast are rife with ash deposits that go beyond the residues of mundane burning activities. Burials and other pits at Stallings Island have layers of wood ash sandwiched between charcoal and shell; some rockshelters of the Cumberland Plateau contain successive layers of ash, each capped with earth; freshwater shell was mixed with ash to fill a massive pit on Silver Glen Run; and in north-central Florida, a dried sink filled with peat was burned to produce an ash layer containing scores of vessels. These and other cases span millennia and vast geography, and thus do not lend themselves to generalizations about the meaning or purpose of ash as a medium of ritual practice. However, in the broader cosmological framework of the Native Southeast, ash is a substance that was brought into existence through a transformation of matter that connected the Lower and Upper Worlds. In this sense, ash was indexical of cleansing or rebirth, much as the lifting smoke of a burning fire or the rising celestial bodies of the eastern horizon. As an ascendant, ash interacted with other agents to effect change or ensure desired outcomes while offering technical options for materializing expectation.

[292] *Discussant*

Sassaman, Kenneth [95] see Gilmore, Zackary

Saucedo, Alfredo

[19] *Maíz y olmecas: una truculenta trayectoria*

Tradicionalmente en la arqueología de la costa del golfo y en específico, dentro de la zona nuclear olmeca se había propuesto que uno de los principales productos que se consumieron durante el preclásico por la sociedad olmeca fue el maíz. Aunado a esto las constantes representaciones de esta planta dentro del sistema de registro olmeca, sugerían una tendencia muy marcada y una preferencia inminente a la producción de este alimento, ya sea con fines ceremoniales o para consumo. Sin embargo, recientemente se ha observado que durante la larga trayectoria ocupacional de este grupo en la zona nuclear hay diferentes tendencias alimenticias que indican la diversificación de alimentos y la preferencia o viabilidad de algunos productos sobre otros en distintas épocas. Por lo tanto, a través de la iconografía inmersa en el arte escultórico masivo y portátil olmeca, y de los datos paleoetnobotánicos disponibles se traza la trayectoria y cambios más notorios en la dieta olmeca para lograr un acercamiento a los procesos que desembocaron en esta selección de alimentos. En este sentido, ¿Cómo, cuándo, dónde y en que nivel tuvo preferencia el consumo del maíz?.

Saunders, Cece (Historical Perspectives, Inc.)

[203] *What a Pain in the Ash....Traveling That Bumpy Road*

How did man, horse and wagon traverse the muck and marshes that so often surrounded America's earliest coastal towns? Without the benefit of iron, steel, and concrete, the 18th century road builder could span muddy stretches with a corduroy road. This road type was made by placing whole, sand-covered logs perpendicular to the direction of the road in low or swampy areas. The corduroy road was an essential technique for establishing networks between communities and critical resources. The Ash Creek Corduroy Road is a preserved archaeological site directly associated with the colonial history of Fairfield, CT. A tidal grist mill and a dam were established ca. 1750 at the mouth of Ash Creek. A corduroy road was constructed along the Creek's salt marsh to link an early town road, the mill, and the Black Rock residents. Today, an intact 53-foot section of this road is visible at low tide, resting 36" below a mat of cord grass. It survives as an evocative remnant of a colonial road system. It appears to be the oldest remaining example of a preserved wooden road in the state and is a protected Archaeological Preserve.

Saunders, Hunter [182] see Miller, D. Shane

Savage, Sheila (University of Oklahoma), Scott Hammerstedt (University of Oklahoma) and Amanda Regnier (University of Oklahoma)

[119] *Life on the Margins: Eastern Oklahoma's Arkansas Drainage between 1300 and 1500 CE*

Beginning around 1100 CE, residents of the eastern Oklahoma Arkansas River drainage built mounds, shared elaborate mortuary rituals, and on some level participated in a maize-based agricultural system. These aspects of the broader Mississippian pattern were centered at Spiro Mounds. Beginning in 1300 CE, people began abandoning the mound sites on the margins of the Southern Plains. As climate conditions worsened in the fifteenth century, the residents of the Arkansas drainage adopted Plains Village strategies, including bison hunting. The emergence of this new way of life coincided with the widespread collapse of Mississippian polities in the east.

Savarese, Michael (Florida Gulf Coast University), Antonio Arruza (Florida Gulf Coast University), Victor Thompson (University of Georgia), Karen Walker (Florida Museum of Natural History) and William Marquardt (Florida Museum of Natural History)

[35] *Paleoenvironmental Context of Calusa Cultural Evolution on Mound Key, Estero Bay, Southwest Florida*

The Calusa occupied Mound Key in Estero Bay, southwest Florida, from approximately AD600 to the 1700s with this location serving as a cultural and political center from ca. AD950. As a fisher-gatherer-hunter society, they heavily exploited the shellfish and finfish resources of the estuary. During this time, Estero Bay's estuarine ecology and coastal geomorphology developed in response to variable rates of sea-level rise (SLR) and climate change.

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Our work integrates archaeological and geological perspectives on this intertwined history of the Calusa and their environment. Specifically, we found correlations between shifts in estuarine salinity of the bay, as it closed, and the types of shellfish exploited by its inhabitants. As salinity lowered in the bay, favoring oyster reef productivity, the Calusa shifted away from more marine-based shellfish and to more heavily exploit oyster resources for surplus production. Concomitant with these shifts were changes in site organization and layout, which included construction and alteration of new landforms and features (e.g., canals and mounds). Estuarine conditions today are comparable to those in Calusa's later history, but SLR acceleration threatens a shift back to the earlier estuarine ecology and geomorphology. Consequently, Calusa's historical ecology provides insights for future environmental management of the bay.

Savarese, Michael [35] see Marquardt, William

Savelle, James [16] see Howse, Lesley

Sawchuk, Elizabeth [198] see Chritz, Kendra

Sawyer, Alicia (School of History, Classics, and Archaeology, Newcastle University)

[23] *Beyond a Record of Environmental Change: The Influence of Variability in Peat Composition on the Archaeological Record in Viking Age Iceland*

Research suggests non-woody resources, such as peat, can serve as unique repositories of environmental change. This paper discusses how peat serves such a role, and sheds light on the how these processes affect the archaeological record, an aspect of environmental change that has been overlooked. During the colonization of Iceland in the 9th century AD, early Icelanders (Vikings) began to affect and be affected by local environments. Viking colonization led to rapid deforestation of woodland resources, resulting in soil loss and increased aeolian deposition. As wood was scarce, peat and turf were commonly used as fuel sources and construction materials in Iceland. Due to the ubiquity of these materials, changes in the quality of peat and turf potentially influenced past human behavior (i.e., fuel selection, resource management, and waste production) and the archaeological record (i.e., waste disposal, farm mound development, and landscape alteration). Using micromorphology and geochemical analyses on experimentally combusted peat from a continuous bog sequence, this research will identify compositional changes and shifts in fuel quality over time. These data will provide information on resource access, wealth distribution, site formation processes, and human-environment interactions.

Sawyer, Elizabeth (Monticello Department of Archaeology), Katelyn Coughlan (Monticello Department of Archaeology) and Crystal Ptacek (Monticello Department of Archaeology)

[241] *Identifying Source Deposits in Monticello's South Pavilion*

During the winter of 2016, archaeologists excavated the interior of Monticello's South Pavilion in advance of restoration. The South Pavilion's basement served as the original kitchen until 1808, when it was connected to the main house via the South Dependency Wing and repurposed into a wash house. In order to level the floors between the South Pavilion basement and the new, immediately adjacent wing, Thomas Jefferson's enslaved laborers used three feet of sediment to raise the basement floor. Recent excavations removed nearly a third of this fill. Preliminary analysis presented at the 2017 SHA Conference sought to establish a chronology for these South Pavilion deposits. Results also indicated a strong resemblance in both sediment and artifact composition to strata excavated in the nearby Kitchen Yard by Dr. William Kelso during the 1980s and re-analyzed in 2008. Using statistical analyses, this poster expands upon those findings to check the validity of one origin source for both the Kitchen Yard and South Pavilion deposits. Using a stratified random sample of Kitchen Yard deposits with established, pre-1809 depositional date ranges, we assess similarities in ceramic assemblages to the fill in the South Pavilion basement.

Sayle, Kerry [29] see Hamilton, Derek

Sayre, Matthew (University of South Dakota), Aaron Mayer (South Dakota State Historical Society), Corina Kellner (Northern Arizona University) and Justin Jennings (Royal Ontario Museum)

[335] *Ritual Foods Compared with Daily Diet at Tenahaha in the Cotahuasi Valley during the Andean Middle Horizon*

People in the past actively chose which foods were used in different contexts. Here we compare plant remains with human skeletal remains to understand dietary practices at Tenahaha in the Cotahuasi Valley (AD 850–1050). Tenahaha was built during the Middle Horizon as a communal space to take advantage of new social interaction spheres, stimulated in part by the Wari state. Tenahaha includes burial areas as well as food storage and preparation zones. Macrobotanical remains were found in public rather than private locations, indicating communal production of food and drink. Quinoa, tubers, and molle were ubiquitous at the site, along with maize, with chicha made of maize/molle produced and consumed there. These remains suggest a ritual or communal diet heavy in C3 foods, although taphonomy and food processing will also be considered as mediating factors. In comparison, stable isotope analysis of individuals buried at the site compare favorably to the elite inhabitants of the Wari secondary city of Conchopata, who ate a diet dominated by C4 plants (maize) and meat (maize foddered camelids). Taphonomic concerns should not be ruled out, but communal use of foods with deeper histories than maize suggests active differentiation between daily and ritual diet at Tenahaha.

Scaffidi, Beth (Arizona State University)

[335] *Violent Ritual and Inter-regional Interaction during the Early Intermediate Period and Early Middle Horizon in the Majes Valley, Arequipa, Peru*

Artifacts from yungas and coastal zones of Arequipa, Peru show varying degrees of integration into the ideological and material networks of prominent neighboring cultures of the Early Intermediate Period (Nasca) and Middle Horizon (Wari). Ongoing research suggests these communities and towns were well-integrated into foreign trading networks, whether through direct interaction with foreign traders or down-the-line exchange. While foreign-produced goods and emulation of foreign goods or architectural canons can provide circumstantial evidence of inter-regional connectivity, isotopic analysis of human skeletons can offer concrete evidence that non-locals visited, resided in, or were buried in a community. This research synthesizes results of isotopic analysis of human skeletons from the cemetery of Uraca, in the Majes Valley, and describes the artifact assemblage recovered. The data presented will demonstrate that the individuals interred at the site were linked to material and ideological traditions of Nasca and other desert and coastal valleys through mortuary practices and violent trophy-head taking, while there is only limited evidence that they emulated Wari material culture or tapped into Middle Horizon trade networks. The results suggest that Uraca's interaction with foreigners was ideologically linked to rituals of violence and death, rather than materially linked to economic and subsistence practices.

[335] *Chair*

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Scarborough, Vernon (University of Cincinnati) and Christian Isendahl (University of Gothenburg)**[213]** *The Early Role of Biogeography in the Creation of Modern Ecology Assessments*

The landscapes and natural environments within the tropics and their wet-dry forests were the seat for understanding modern ecological principles. Initiated by Alexander von Humboldt and fundamentally altered theoretically by Charles Darwin, contemporary views of the couple human-nature dynamic were "discovered" in the New World first. Unlike the prominent worldview identifiable in the Near East and subsequently in early colonizing Europe in which "man must have dominion over the fish of the sea, and over the fowl of the air, and over every living thing that moves upon the earth" (Genesis 1:28), Central and South America settings show the inextricable affinity between humanity and the slowly modified biogeography. Clearly denudation did occur, but it was never on the scale practiced in the West. Technological thresholds and breakthroughs seldom accelerated through time; and the role of labor in an environment without widespread domesticated animals and zoonotic diseases made for a different ecological emphasis and a worldview that cultivated the role of plants, animals and their interplay. The domestication process was markedly different than in the Old World, one that less honored and preserved the greater environs.

Scarborough, Vernon [76] see Lentz, David L.

Scarry, C. Margaret (Univ. of North Carolina-Chapel Hill) and W. Flint Dibble (Wiener Lab, American School of Classical Studies a)**[298]** *Bridging the Divides at Azoria: Environmental Archaeology at an Archaic Greek City*

Excavations at the Archaic (7th-6th centuries B.C.) city of Azoria on Crete demonstrate the value of intensive environmental archaeology for understanding an historical Greek context. Texts document the important role of food and dining to ancient religion and politics; however, ancient authors presented a normative picture and excluded details they assumed were common knowledge. Studying plant and animal remains can "ground-truth" ancient sources on foodways and provide contextual nuances not afforded to historians.

The prevalence of a few domesticates presents difficulties in fields largely based on discussions of taxonomic variability, especially when trying to bridge the divide between archaeobotanical and zooarchaeological assemblages. While it is difficult to relate the numerous goats to the abundant olives at Azoria, our interdisciplinary study presents the opportunity to examine varied contexts. Deposition of plant remains happens largely before the meal is served while animals are largely deposited after dinner. Our analyses reveal that conspicuous storage and communal dining formed the backbone of the political structure at Azoria. The specific foodstuffs stored and consumed in civic buildings were much the same as those consumed in townhouses. However, the quantity and elaboration of foodstuffs within communal dining structures created a convivial community at Azoria.

Schaafsma, Polly (Research Associate, MIAC\LOA)**[131]** *Proposed Historical Origins of the Tablita Dance of the Rio Grande Pueblos*

The Tablita Dance, commonly known as the Corn Dance, is a well-known event among the Rio Grande Pueblos where, in connection with saint's days, it is performed during the growing season. The corn dance may occur at other times as well, but without a linkage to the village patron saint. A number of diverse factors, however, indicate that this dance as known today is a post-Hispanic aspect of Pueblo ceremonialism. In addition to the dance's obvious link to the Catholic patron saint of each Pueblo, is the bannered standard of proposed native Mexican origin, and finally the absence in prehispanic Pueblo art for the distinctive iconography of this dance. In this paper I explore this proposal with the supporting evidence from Aztec codices, Spanish documents, and prehispanic Pueblo rock art and kiva murals to suggest that in origin, this ritual occasion is more complex than a simple synthesis of homage to a patron saint tacked on to a preexisting ancient indigenous ceremony.

Schaan, Denise [116] see Maezumi, S.

Schach, Emily (Arizona State University) and Jane E. Buikstra (Arizona State University)**[66]** *Gender at Chiribaya Alta: A Multiple Correspondence Analysis of Funerary Offerings*

Chiribaya Alta is a Late Intermediate Period cemetery site located in the Osmore drainage of Southern Peru and is the largest, most elaborate site associated with the Chiribaya polity. Previous univariate mortuary analyses at Chiribaya Alta have identified gendered grave goods, related to roles during life. These analyses, however, assume a binary distinction between males and females by only testing graves with sexed skeletons. Here, we use a multivariate technique, multiple correspondence analysis, to analyze the graves at Chiribaya Alta. Sex is not included in this analysis and thus, the MCA groups graves without assuming a binary construction of sex. Instead, sex information is only used in the interpretation phase of the analysis. Our MCA confirms that Chiribaya graves are differentiated by gender based on funerary objects but shows greater variation in the graves of females in comparison to males, suggesting that women's gendered activities were more variable than those of men. Furthermore, the overlap in the graves of males and females suggests that these gender categories are not binary opposites, and thus we suggest an alternative system for conceptualizing gender identity in the Chiribaya polity.

Schachner, Gregson [218] see Duff, Andrew

Schaefer, Benjamin (Department of Anthropology, Georgia State University), Sloan Williams (Department of Anthropology, University of Illinois) and Nicola Sharratt (Department of Anthropology, Georgia State University)**[270]** *Constructing a Colony: Investigating Stress from Endogenous Cortisol in Archaeological Hair from a Lupaqa Colony at Estuquiña*

Using enzyme-linked immunosorbent assay (ELISA) to obtain segmented cortisol levels, these cortisol levels can reconstruct periods of heightened month-to-month duress leading up to death. Segmented cortisol levels provide a more nuanced understanding of stress variation through biocultural change and lived experiences in antiquity. This study aims to reconstruct periods of duress through assaying endogenous cortisol in archaeological hair (n=11) from the site of Estuquiña and investigate the effects of a mitmaquna development. The site is located outside the modern city of Moquegua in the Moquegua Valley of southern Peru and was likely established as a Lupaqa colony settlement during the Late Intermediate Period (AD 1100–1476); a period characterized by regional development and political transition throughout much of Andean South America. Preliminary results suggest that there is a difference in cortisol levels in juveniles (18–64±19 ng/g) compared to adults (150–248±68 ng/g) and clinical data (104–134±40 ng/g). This exploratory research suggests that the variation in cortisol levels at Estuquiña differs based on sex and pre- and post- pubertal development at time of death.

Schaefer, Jonathan (University of Missouri) and Leslie Aragon**[91]** *Regional Influences on Cliff Phase Ground Stone in the Upper Gila Area*

Ground stone tools are a productive means of studying subsistence and technology practices in the American Southwest. Excavations at the Gila River Farm Site and other nearby settlements have provided a large collection of ground stone objects used for various tasks. Here, we evaluate the use of the tools from these sites and compare their morphology to tools recovered elsewhere in the Kayenta and Mogollon areas. Regional and temporal variations in ground stone characteristics provide insights into how earlier archaeological traditions influenced ground stone tool morphology in the Cliff phase in southwest New Mexico.

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Schaefer, Richard (Historical Perspectives, Inc.)**[203]** *"His Beloved Aunt Polly": The Aunt Polly Archaeological Preserve and the Life of the First Sherlock Holmes*

The most renowned stage portrayal of Sherlock Holmes, it was William Gillette who brought Conan Doyle's detective to life for audiences as well as for every actor that followed in his footsteps. Most importantly, he originated the Holmes "look": the deerstalker hat, the curved pipe, and the Inverness cape. In his day, Gillette was the wealthiest actor in the country. He spared no expense in building his eccentric stone "Castle," perched high above the Connecticut River, and in the creation his beloved Aunt Polly, a naphtha-powered yacht he commissioned in 1899. Moored at the riverbank beneath the Castle, Aunt Polly burned to the waterline in 1932 under mysterious circumstances. Research and underwater archaeology on the Aunt Polly and her remains are now being incorporated into the Gillette Castle's museum and waterfront park.

Schäfer, Manfred [83] see Borck, Lewis

Schaffer, William (Arizona State University)**[337b]** *Mitochondrial DNA Results from the Kormantse Archaeological Research Project*

Kormantse is an influential and celebrated place name in the African Diaspora. Some scholars estimate that more slaves were transported from Kormantse and nearby Fort William in Anamabo than most other West African ports. For the last ten years, the Kormantse Archaeological Research Project (KARP) has been studying the human skeletal remains recovered from the site. A combination of PCR-based techniques, targeted enrichment, and next-generation sequencing of Kormantse teeth has confirmed endogenous DNA that is associated with common African haplogroups. While it is expected that little DNA will survive in the tropical and subtropical latitudes of Africa, this study demonstrates that small amounts of aDNA—in some cases informative of mtDNA haplotype—can survive extensive tropical environs and humidity as well as aggressive seasonal turnover provided that the remains are from recent excavations, and are controlled for DNA contamination during and after the field season. These haplogroups are discussed within the context of the African Diaspora and its occurrence in areas of the Americas, particularly the Caribbean, circum-Caribbean and South America.

[337b] *Chair***Scharf, Elizabeth (University of North Dakota)****[35]** *Vegetation Change at Poverty Point, Louisiana*

This paper presents pollen data as a proxy of past vegetation at Poverty Point, a large Archaic mound site in northeast Louisiana. The paleoecological focus of this presentation revolves around the rate and nature of change over time. Patterns and changes in taxonomic diversity are presented and discussed in light of environmental productivity. The rate of vegetation change is calculated and related to ecosystem stability. Additionally, changes in individual taxonomic representation are examined to determine if change over time occurs piecemeal or to entire plant communities. Such findings will be related to the impact of vegetation change on people and the role of anthropogenic change in shaping the local environment.

Schauer, Peter (UCL Institute of Archaeology), Kevan Edinborough (UCL Institute of Archaeology), Stephen Shennan (UCL Institute of Archaeology), Andrew Bevan (UCL Institute of Archaeology) and Mike Parker Pearson (UCL Institute of Archaeology)**[29]** *Explaining Variation in the Scale of Neolithic Quarry and Mine Production*

In recent years new methods have been developed for using summed radiocarbon probabilities as a population proxy and for comparing radiocarbon datasets to establish whether they are significantly different from one another, while taking into account sampling variation and the patterns in the calibration curve. On the basis of newly collected and updated radiocarbon data on the dating of Neolithic mines and quarries in Britain, Ireland and continental Northwest Europe, the paper will present the results of using these methods to compare the chronological distribution of mine and quarry exploitation with regional fluctuations in the population of early farmers and in the scale of forest clearance that they undertook, to test the hypothesis that the intensity of production depended on variation in the demand generated by the population and its clearance activities. It will do this by simulating large numbers of mine date samples on the assumption that they represent random samples of the population and clearance distribution and comparing these with the observed distribution.

Scheffler, Kirk [240] see Harris, Ashley

Scheiber, Laura (Indiana University) and Kirsten Hawley (Indiana University)**[101]** *A Picture Is Worth a Thousand Words: Reading the Past and (Digital) Interpretation in the 21st Century, a Case Study from the Bighorn Basin, Wyoming*

During 2016 and 2017, Bighorn Archaeology participants used on-the-ground photogrammetric methods and aerial photography to document features at archaeological sites throughout the Bighorn Basin and surrounding foothills in northwestern Wyoming. The sample includes both horizontal and vertical features such as stone circles (tipi rings), a hunting driveline, defensive rock bulwarks, and pictograph rock shelter overhang panels. In this presentation, we discuss our evolving methodology and the resulting three-dimensional models and orthomosaics, along with implications for future uses of these techniques. The applied methodology highlights the potential of this emerging technology to rapidly document and assess site features when on-site time is limited. We also discuss issues related to processing, affected by proprietary software availability and computer memory capacity, especially for building models while in the field. High-precision technology applied to document surface architecture and fragile rock art on the mountains and plains of western North America in the last decade has focused on establishing regularized patterns of domestic life and distributions of resources across the broader social landscape. Layering in three-dimensional models produced using hundreds of photographs from a DSLR camera further directs these efforts and re-defines expectations for archaeological interpretations, especially in cultural heritage and preservation dialogues.

Scheiber, Laura [124] see Ortman, Scott G.

Scher, Sarahh (Salem State University)**[216]** *Seeing Gender Ambiguity in Moche Visual Culture*

This paper explores the visual language of gender expression in Moche art, seeking to determine the relationships among ambiguous gender, social role, and status in Moche visual culture. The Moche are well-known for their representations of warriors and warfare, as well as the sacrificial rituals associated with the taking of prisoners. However, this martial focus was not consistent across Moche time and space, and regional variations indicate the existence of a potential field of expression which was used differently in different areas and times. In this paper, I explore that potential field of expression, and the representations of gender that could exist outside of the strongly-gendered warriors and priests. I focus instead on the center of a Moche spectrum of gender that had women at one end and men on the other. Clothing could cover areas of the body associated with gender identity, and diagnostic elements such as hairstyle could be covered or simply not expressed. In addition, contextual elements such as ornaments and adornments, items held in the hand, or settings can give clues to social roles and status relative to the warriors and priests, and form a greater understanding of how the iconography deals with gender.

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Scherer, Andrew (Brown University)**[163]** *Recent Investigations of War, Economy, and Population at Piedras Negras, Guatemala*

This paper presents a synthesis of current results from the 2016–2017 research seasons at Piedras Negras, Guatemala with implications for understanding warfare, economy, politics, and population dynamics throughout the ancient kingdom. First, while project members had identified a series of fortified centers and palisades in the region's hinterlands, the recent identification of fortifications in the near periphery of Piedras Negras makes it one of the rare polity capitals in the southern Maya lowlands where such features have been reported. Second, while regional research had revealed evidence for craft production and exchange, prior evidence for craft production at Piedras Negras was relatively scant. Recent excavations have significantly altered this perspective and changed our understandings of economic integration at the capital and across the kingdom. Third, prior subsistence and diet research largely focused on soils and bone isotopes, while the present project adds the complexity of research into plant economies. Further, project participants have begun to draw together the disparate threads of settlement research to produce a more integrative picture of settlement dynamics. Finally, a return to Piedras Negras has also afforded the opportunity to further conserve the site and engage with local stakeholders for long-term protection.

[292] *Discussant***[163]** *Chair*

Scherer, Andrew [109] see Golden, Charles

Schermer, Shirley J. [166] see Tiffany, Joseph

Schiappacasse, Paola (Universidad de Puerto Rico)**[138]** *Stored and Forgotten: Academic Research Projects Using Archaeological Collections*

Around the world, there are a large number of archaeological collections in the repositories of museums, universities, foundations, government agencies and other organizations. The curation crisis has generated a great deal of debate as to how we can help to ameliorate the various problems faced in collections management. This paper will present a proposal of how collections can be used to develop academic projects, both in local repositories and those outside the country, by outlining case studies that can serve as a template for research design. Finally, it will be demonstrated that the collaboration between personnel from the repositories and universities is the ideal alliance to encourage students to revisit archaeological collections for their research projects.

[108] *Discussant***[57]** *Chair*

Schiappacasse, Paola [57] see Pérez, Jan

Schieppati, Frank [73] see Hayward, Michele

Schilt, Flora [198] see Thompson, Jessica

Schjellerup, Inge**[178]** *The Capac ñan from Chachapoyas to the Tierra adentro*

The capac ñan from Chachapoyas to Moyobamba was used for centuries before another road was built for driving traffic and latest with the Marginal further on to Tarapoto. The capac ñan was used by the Incas in their conquest of Moyobamba and later to be used by the many Spanish campaigns in their search for Eldorado. This important highland/lowland route crossing the cordillera and continuing into the Ceja de Selva gave access to coveted resources from both sides but also facilitated war parties to attack the highlanders. During our investigations in recent years, we have located the ancient trail which was stone paved for long stretches and found documents in the archives showing the existence of hitherto unknown tribes that lived along the river systems up to the end of the 17th century.

Schlegel, Trinity**[338]** *Prioritizing Title IX in Private Cultural Resource Management*

Cultural Resource Management (CRM) employs approximately 63% of archaeologists in the United States. Private consulting firms contract with federal agencies to assist in compliance with federal laws such as NHPA, NAGPRA, ARPA and AHPA, and additional state laws. As contract archaeologists, we often work extended periods within small groups in isolated areas, which lends to work environments away from support systems of family and friends. Co-workers depend on each other for safety and support in more intimate environments than non-field work. This intimate nature of our work environment often permits lines between professional/formal relationships and personal relationships to blur. Consequently, individual behaviors, intentional or not, can result in uncomfortable and/or un-safe work environments. Field conditions can provide a context in which civil rights and Title IX can inadvertently be lost. In addition, the small, isolated nature of the group can act as a deterrent to speaking out against harassment or discrimination. I argue that CRM firms need to prioritize Title IX to the same degree as other federal laws that govern our work. To redefine the existing culture of our field, individuals at all levels must participate in the discussions and creation of a safe, healthy and respectful work environment.

Schleher, Kari (Crow Canyon Archaeological Center), Emma Britton (University of California, Santa Cruz), Donna Glowacki (University of Notre Dame), Jeffrey R. Ferguson (University of Missouri) and Robin Lyle (Crow Canyon Archaeological Center)**[95]** *Pottery Production at the Dillard Site: An Early Basketmaker III Community Center in the Central Mesa Verde Region*

The Dillard site (5MT10647)-the earliest community center identified in the Mesa Verde region-may contain among the oldest examples of multi-household pottery production during the Basketmaker III period. A thorough understanding of how pottery was produced and obtained at this early large pithouse village, which is centered on a great kiva, provides important insights on village organization and interpersonal relationships. In this poster, we explore compositional variation in pottery production using three data sets to evaluate variation in materials used in pottery production: binocular and petrographic qualitative analyses of temper, refiring, and neutron activation analysis of paste. These lines of evidence allow us to identify spatial patterns in the distribution of pottery and its potential compositional differences among the pithouses at the Dillard site in order to address the organization of production, as well as the extent of influence the Dillard site may have had on the broader surrounding community through pottery production and exchange. Methodologically, we also compare the correspondence of compositional groups to refire color groups in order to determine the potential use of the refiring technique as an inexpensive compositional method for future projects in the area.

Schleier, Jonathan [332] see Herbert, Joseph

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Schmader, Matthew (University of New Mexico)

[27] *Evolutionary Change in Household Architecture, Settlement Patterns, and Subsistence Technology: A 4000 Year-Long Record from the Middle Rio Grande Valley, New Mexico*

Evolution in domestic architecture, settlement patterns, and subsistence technology can be revealed by long-term stability followed by rapid change. Research in the middle Rio Grande valley of New Mexico documents a 4,000-year long record from 3000 BC to AD 900. Archaic period structures, dated 3000 BC to about AD 250, display little change in form, size, and construction details. Settlement pattern changes appear with the first midden deposits and increased numbers of dwellings with associated storage features. Constructed milling features for processing wild seed appear before the adoption of cultigens.

Long-term architectural and technological stability gave way to rapid change coinciding with the appearance of agricultural domesticates after AD 500. Multi-dwelling sites and architectural investments indicate decreased residential mobility. Simultaneously, distinctions in functionally specific domestic spaces appear with the separation of cooking areas from sleeping spaces. Sweeping changes occur in subsistence technology: groundstone reflects the shift from a seed-based diet to a corn-based diet. Cooking features changed from rock-lined pits to formalized hearths. Domesticated corn required ceramics for cooking; size, shape, and location of storage features also changed rapidly. Implications for cultural continuity and in-place population growth are discussed in light of these long-term trends.

Schmittner, Robert [134] see Saldana, Melanie

Schneider, Tsim [327] see Panich, Lee

Schneiderman, Faline

[203] *Canning and Preserving History at The Borden's Condensed Milk Factory Site in Torrington, CT*

Gail Borden was a man of persistence and a creative inventor. Were it not for his inquisitiveness and drive in the wake of numerous failures, canned milk and Elsie the cow would never have become irrevocably connected in the minds of millions. Failing to make functional his terraqueous prairie-schooner or to make his desiccated meat-bread palatable, he pursued methods of condensing and preserving milk in sealed containers at several locations in Connecticut. Before his success, bacterial infested milk caused a dreaded, and sometimes lethal, illness. His meticulous attention to cleanliness and adoption of a vacuum pan for condensing milk that the Shakers used for condensing juice was a recipe for success. His preserving and canning process allowed protein-rich sanitary milk to reach those who could not reach for the cow. His successes proved vital to the military and long-distance travelers alike. The Borden's Condensed Milk Factory Site in Torrington Connecticut was one of his earliest condensing factories, relying on the waters cascading down from Burr Mountain Pond to power the process—the same waters that eventually carried much of his factory building away. The factory site and its remains are now, befittingly, a Connecticut State Archaeological Preserve.

Schnell, Joshua (Brown University), Sarah Newman (James Madison University) and Andrew Scherer (Brown University)

[163] *Animal, Human, and Crafted Bone from the S-Sector of Piedras Negras*

Excavations within the S-Sector at Piedras Negras in 2016 yielded an assemblage of lithic and bone artifacts consistent with evidence of craft production. The Proyecto Paisaje Piedras Negras—Yaxchilan returned to the S-Sector during the 2017 field season to conduct more extensive excavations in an attempt to understand production and exchange at this Maya polity capital. Between the 2016 and 2017 seasons, over 4,300 fragments of worked and unworked bone, both human and animal, were excavated from the S-Sector. Here we present the preliminary results of an integrated bioarchaeological and zooarchaeological analysis of the materials. The significance of this assemblage lies in its composition, consisting of both human and animal bone, including finished tools, ornaments, and production debris. Especially notable are large quantities of bone objects used in the working of textiles. Among the human remains are a sizeable quantity of isolated, pathological teeth that we believe may be the remains of tooth extractions.

Schollmeyer, Karen (Archaeology Southwest)

[91] *Strange Birds: Avian Remains in the Upper Gila and Mimbres Drainages*

Bird remains are seldom abundant in archaeological assemblages in the Mimbres region of southwest New Mexico. Despite their relatively low frequency, many of the occurrences of bird remains in this area are derived from interesting or unusual archaeological contexts, and provide a wealth of information on cultural practices and local and regional environmental conditions. This study examines data from over 70 archaeological assemblages from the upper Gila area and elsewhere in the Mimbres region, presenting regional and drainage-level patterns in the abundance of different bird taxa as well as temporal changes visible over the period from AD 200–1450. It also highlights recurring associations of particular taxa with specific archaeological contexts, including room closure deposits.

[91] *Chair*

Schollmeyer, Karen [91] see Johnson, Susannah

Scholnick, Jonathan [302] see Munson, Jessica

Schon, Robert (University of Arizona)

[305] *The Archaeology of Baseball: Excavations at Warren Ballpark in Bisbee, AZ*

Warren Ballpark is considered the oldest continuously operating baseball field in the United States. The list of athletes who played at the park throughout its history includes Connie Mack (Major League Baseball's winningest manager), Jim Thorpe (arguably the greatest athlete of the twentieth century), and Earl Wilson (the first African-American pitcher for the Boston Red Sox). Despite this history of competition, very little is known about the spectators who visited Warren Ballpark. The excavation, the first ever of a baseball field, explores areas underneath the grandstands where fans congregated. Early results consist primarily of bottle fragments. We have identified soft drink bottles from the 1920's-1940s including Orange Crush, Coca Cola, and Pepsi as well as beer and liquor bottles from the 1940s-1950s. Spatial patterns also emerged with soft drinks dominant in the infield and alcohol more prevalent in the outfield. In addition to revealing beverage consumption patterns, bottle remains have yielded data concerning Bisbee's economy as we have identified bottles made in local bottling plants, as well as those imported to Bisbee by rail from points east. Such micro-historical data provide valuable insights into the lives of people who lived in this remote mining town during the early twentieth century.

Schott, Amy (University of Arizona, Petrified Forest National Park)

[221] *Soil Quality and Agricultural Productivity of Eolian Landscapes in Petrified Forest National Park*

The Petrified Forest National Park in northeastern Arizona contains extensive sand sheets and dunes. Archaeologists have long recognized the importance of the eolian landscape for prehistoric agriculture. Archaeological sites dating from c. 200–1400 A.D. correlate with eolian landscape features, which suggests that eolian soils were used for dry-farmed dune agriculture. Eolian soils are not always conducive to dry-farmed agriculture;

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however, dune farming is known ethnographically, and has been inferred in archaeological contexts on the southern Colorado Plateau. Previous work by the author has demonstrated that eolian soils in the Petrified Forest National Park are high in clay, which may have increased the water holding capacity of the soils, improving their suitability for farming. This study uses soil chemistry to further test the suitability of eolian sediments for prehistoric cultivation in the region. Soil chemical and physical analyses include soil nitrogen, phosphorus, phosphate, organic matter, calcium carbonate, and bulk density. These are used to document the relative quality of eolian soils in the study region for prehistoric agriculture. In addition, soil geomorphic studies demonstrate the geologic conditions that made agriculture possible, and perhaps even productive, in a marginal landscape.

Schreg, Rainer [140] see Fisher, Lynn

Schreiber, Katharina (University of California—Santa Barbara)
[335] *Discussant*

Schreiner, Nina

[39] *Archaeology of a Frontier Plantation: Collections Analysis at Woodville Plantation, Pennsylvania, c. 1780*

Woodville Plantation, also known as the Neville House, is an important archaeological resource just outside Pittsburgh, Pennsylvania. The mansion was constructed c. 1780 by the family of Virginian General John Neville—of the Seven Years War, Revolutionary War, Whiskey Rebellion, and early state and local governments—and was occupied by their descendants until 1973. This unique record of ownership resulted in a relatively undisturbed site delivered into the hands of a private preservation organization. Recent architectural renovation projects have unearthed an extensive collection of artifacts dating to the entire period of European occupation and an earlier Monongahela Indian hamlet. This report introduces the curated collection, which will be available for the first time for professional research. It also illustrates challenges in the analysis and preservation of diverse archaeological collections at privately owned institutions with limited space and financial resources, highlighting public engagement through archaeological education programs.

Schrire, Carmel

[308] *Social Life and Social Death among Cape Slaves*

A central imperative in historical archaeology is to produce original information and insights that cannot be derived from historical records. Sophisticated analyses of slave burials that combine the physical elements of burial grounds, coffins, and grave goods, with the biology and chemical signatures of the human remains, can identify and source first-generation slaves, and help to infer the social bonds reflected in their burial. Orlando Patterson has defined slavery as “social death” to reflect the nature and impact of forced translocation and cultural depletion. Unassailable as this might seem at first glance, recent work in underclass burial grounds at the Cape and elsewhere, challenge this deathly pronouncement by suggesting that slaves from a multiplicity of foreign homelands were incorporated into a vibrant community of free and unfree people and who nurtured them beyond their short life into the long comfort of death. This finding casts a new light on the historical records to reveal the permeable nature of slave society in the wider colonial world.

Schroder, Whittaker (University of Pennsylvania) and Socorro Jimenez Alvarez (Universidad Autonoma de Yucatan, Merida)

[163] *The Kingdom of Piedras Negras: A View from Mexico*

Though today the Usumacinta River marks part of the boundary of Mexico and Guatemala, during the Classic period the Usumacinta would have passed through numerous kingdoms, including Piedras Negras and Yaxchilan. Alternate travel routes through the valleys to the west in Mexico crossed an even more complicated political landscape approaching the kingdoms of Palenque, Tonina, and Sak Tz'i', as well as the plentiful minor centers and rural settlements throughout the region. While surveys between Piedras Negras and Yaxchilan in Guatemala have identified a definite border between the two kingdoms, research in Mexico has demonstrated a complex frontier that changed throughout the Late Classic period. Still, many of the sites identified by the Proyecto Arqueológico Busiljá-Chocoljá and others known from epigraphy can safely be associated with Piedras Negras at least for part of the Late Classic period, either based on proximity or emic accounts from inscriptions. Where carved monuments are absent, we must rely on archaeological evidence, primarily from ceramics and architecture, to understand this frontier zone of the kingdom of Piedras Negras. In this paper, we present survey and excavation data from this study region to reconstruct a perspective of Piedras Negras from adjacent areas across the Usumacinta in Mexico.

Schroeder, Sissel [215] see Richards, John

Schroedl, Gerald (University of Tennessee), Callie Bennett (University of Tennessee), Ann Ramsey (University of Tennessee) and Todd Ahlman (Southwest Texas State University)

[90] *Historical and Archaeological Contexts for Zooarchaeological Analyses at Brimstone Hill Fortress, St. Kitts, West Indies*

Research at Brimstone Hill Fortress (1690 to 1854) focuses on comparative studies of the eighteenth century lifeways of British soldiers and enslaved Africans. The St. Kitts colonial government and British Royal Engineers designed the fort, and enslaved and free Africans constructed and maintained it. Excavations in areas occupied by British Army officers, enlisted soldiers, and enslaved Africans have produced substantial faunal remains. Especially revealing is the use of imported and local fishes, contrasts in the consumption of fresh and barreled meat, and evidence for the manufacture of bone buttons. Production of these data is attributable to the dogged determination of Walter Klippel and his students.

Schroll, Andrew (Tulane University), Jason Nesbitt (Tulane University), Rachel Johnson (Tulane University) and Sadie Weber (Harvard University)

[6] *Analysis of the Lithic Assemblage from Canchas Uckro (1100–800 BC), Eastern Ancash, Peru*

Canchas Uckro is a large platform situated above the Puccha River, and approximately 25 km to the north of Chavín de Huántar. Recent excavations recovered a lithic assemblage consisting of 245 artifacts from stratigraphic layers dating between ca. 1100 and 800 BC. This poster describes the analysis of this lithic assemblage, including raw materials utilized, technological organization, and patterns of tool design in relation to possible subsistence activities. Expedient flakes from locally available sandstone and limestone comprise the majority of tool types, although finely made chipped quartz and ground slate points, as well as more formal tools like notches, drills, and scrapers, comprise over 5% of the assemblage. In addition, we discuss how the composition and organization of the assemblage complements the zooarchaeological analysis of faunal remains recovered from Canchas Uckro. We argue that the patterns within the Canchas Uckro lithic assemblage indicate a subsistence and processing strategy that largely centers on the exploitation of wild game. Finally, we consider the implications of these patterns for understanding the late Initial Period in highland Peru.

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Schubert, Ashley (University of Michigan) and Maureen Meyers (University of Mississippi)**[255]** *Recognizing Variation in Pisgah Identity across Space and Time*

The late Mississippian Pisgah culture, dating from 1200- 1500 CE, is found across a wide geographic area including western North Carolina, eastern Tennessee, and southwestern Virginia. Pisgah sherds are often recognized by the presence of distinct rectilinear and later curvilinear stamped decoration with sand, grit, and/or mica temper. Excavations by Dickens (1976), Keel (1976), and Moore (1981; 2002) better defined changes over time in Pisgah ceramics while simultaneously showing the variation in Pisgah-associated features, households and settlements. This paper will examine Pisgah ceramics from two sites, Cane River in western North Carolina and Carter Robinson in southwestern Virginia, using an attribute analysis approach and taking into account the artifact, features, and household contexts in which these sherds are found. In addition, comparative data from other Pisgah collections in Virginia, Tennessee, and North Carolina will be used to better understand Pisgah identity.

Schubert, Ashley [119] see Steere, Benjamin

Schuldenrein, Joseph (Geoarcheology Research Assoc)**[289]** *Discussant*

Schuldenrein, Joseph [39] see Wiley, Kevin

Schulenburg, Marcus (University of Wisconsin-Milwaukee)**[26]** *Building Village Communities: Early Fort Ancient Villages in the Ohio Valley*

The Fort Ancient Period (AD 1000–1700) saw the introduction of formal villages to the peoples of the Middle Ohio Valley. To help understand the transition to full time sedentary villages, this paper explores how these new villages operated as communities. This allows for an examination of the relationship between communities and villages as concepts and as organizational units. This paper uses the Guard Village site (12D29), an Early Fort Ancient village, as a case study to examine this new form of community organization. Lines of evidence will be drawn from village architecture, such as site layout and construction techniques as well as the ceramic assemblage including production communities. These data will be used to attempt to identify the social processes, interactions, and mechanisms that were utilized to integrate larger populations into villages, and how people adapted to this new social unit.

Schulting, Rick, Petrus le Roux (Dept. of Geological Sciences, University of Cape T), Yee Min Gan (School of Archaeology, University of Oxford), Gary Lock (School of Archaeology, University of Oxford) and Chris Gosden (School of Archaeology, University of Oxford)**[29]** *The Ups & Downs of Iron Age Animal Management on the Oxfordshire Ridgeway, Southern England*

As in any mixed farming system, the management of animals doubtless played an important part in Iron Age societies in southern Britain. Economically, they furnished meat, milk, wool and manure, and served as draught animals for transport and tillage. Intersecting with their economic uses, they were also important socially, politically and ritually. It is relatively straightforward to determine the proportional representation and mortality profiles of the major species—cattle, sheep/goat and pig. While this provides insights into how and why animals were managed, it does not allow the detailed investigation of how individual animals were actually kept, how they were moved around the landscape, and how various nearby communities integrated their animal management practices. Isotopic approaches can offer insights into just these practices. We report the results of a multi-isotope study Early/Middle Iron Age domestic fauna (cattle, sheep/goat and pig) within a very constrained study area of the Oxfordshire Ridgeway, south-central England. Strontium isotope measurements on dental enamel provide evidence primarily for the mobility of cattle, while bone collagen stable nitrogen isotopes suggest separate herds and flocks. The results indicate that Early/Middle Iron Age stock-keeping on the Ridgeway and in the Vale was complex, and both integrated and distinct.

Schulting, Rick [249] see Santana Sagredo, Francisca

Schultz, John (University of Central Florida, Department of Anthropology)**[62]** *Discussant*

Schultz, John [88] see Gidusko, Kevin

Schulz, Margaret (Colorado State University) and Laurie Rush (DoD-Army, Fort Drum, NY)**[332]** *Staying Relevant: Turning Your Sites from Blights to Rights*

One of the hazards of doing archaeology on federal land is being viewed as a roadblock to training, construction and other undertakings. The normal treatment for National Register eligible sites once they are found is to set them aside as off limits to training and other activities. Naturally, this is not popular with those providing funding to keep training lands open and sustainable. The Fort Drum Cultural Resources Program has developed unique methods for protecting sites while allowing them to be used as training assets. In collaboration with Civil Affairs Operations, they have provided site data in the form of no-strike lists to military trainers, allowing sites to be put into play during several large-scale training events. Program staff also served as role-players, representing host nation officials and indigenous peoples in a training scenario. Not only did this approach enrich the training opportunity, designation of off limits areas as sacred properties where incursion would result in violent retribution or command consequences resulted in the best site protection and avoidance in the history of these exercises. As a bonus for the program, it also served the purpose of keeping cultural resources and heritage relevant in an ever-changing political and social environment.

Schulze, Jurgen (UCSD), Connor Smith (UCSD), Philip Weber (UCSD), Thomas DeFanti (UCSD) and Thomas E. Levy (UCSD)**[172]** *3D Cyber-Archaeology Dissemination through Scientific Visualization—Personal and Large-Scale Virtual Reality Platforms*

We created a walk-up virtual reality system consisting of six large 3D TV displays with 4k resolution, for easy dissemination of spatial and three-dimensional archaeological findings. We call this system the CAVE Kiosk. The system has been placed in the campus library to make it easily accessible to the entire campus community. We currently support three types of data: regular photographs, high resolution panoramic stereo photographs, point clouds such as from LIDAR scanners, and 3D models such as those created by 3D scanners. The user will see all available sites with data on a 3D world map, displayed as a globe. When the user clicks on a site, the available data sets will be listed and the user can choose what to see. The data is hosted by a remote server and is downloaded on demand, with a caching system for faster access. We deployed three more, similar, viewing stations on other campuses of the University of California system. They all connect to the same server, and collaborators at those campuses can upload their data to the shared server via our custom software tool called CAVE Base.

Schulz-Kornas, Ellen [89] see Martisius, Naomi L.

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Schumacher, Mara (Institute for Archaeological Sciences, University of Tuebingen), Susan Mentzer (Institute for Archaeological Sciences, University), Cynthia Debono Spiteri (Department for Prehistory and Early History, Unive) and Mihriban Özbasaran (Arkeoloji Bölümü, İstanbul Üniversitesi)

[126] *Biomolecular and Micromorphological Analysis of Suspected Fecal Deposits at Neolithic Aşıklı Höyük, Turkey*

Suspected fecal matter from the Aceramic Neolithic site of Aşıklı Höyük was analyzed using biomolecular and micromorphological approaches to study behavioral and environmental processes. Aşıklı Höyük provides the earliest evidence for sedentism and domestication in Central Anatolia. The main goal of this study is to identify the origin of suspected fecal deposits to gain a better understanding of the use of space and waste management strategies in this early Neolithic settlement. Suspected fecal materials from middens, open-space deposits and building fills were analyzed using GC-MS to distinguish between fecal and non-fecal sources. Steroid biomarkers were used to differentiate between human and faunal excrements. Preliminary results from biomolecular analysis show that not all suspected fecal materials are actually of fecal origin and may instead be secondary phosphates. Suspected coprolites collected from a building fill could be confirmed to be of ruminant origin suggesting that animals were kept inside the settlement. This finding is supported by the identification of intact dung deposits in thin sections from middens and open-space areas. Coprolitic materials identified in dumped refuse deposits in thin sections yield biomarkers that suggest that omnivore (potentially human) fecal material was disposed together with domestic waste in designated areas within the settlement.

Schumann, Rebecca (University of Illinois)

[42] *The History We Remember: Race, Law, and Understanding the Archaeological Landscape*

Law works in ways to promote specific interests of those with power, often leading to racial and economic marginalization. Through an examination of 18th and early 19th century Virginia laws, I investigate the relationship between law and race. I explore how laws help shape racial categories and forms of structural racism, and promotes economic inequality. These historical economic and racial inequalities impact how we understand archaeological landscapes and whether sites meet the criteria for the National Register of Historic Places. As a result, past forms of structural racism continue to affect our present day understanding and treatment of historical people in the present, engendering historical silences. Using archaeological sites from George Washington's Mount Vernon, I examine how laws governing archaeological sites continue to marginalize in the present those who US society marginalized in the past. Since these laws help determine what constitutes historically significant parts of the American past, they and promote disparity in determining whose history we remember and preserve.

Schurr, Mark (University of Notre Dame) and Madeleine McLeester (University of Notre Dame)

[26] *Native Prairie: The Kankakee Protohistory Project and Ongoing Excavations at the Terminal Prehistoric Middle Grant Creek Site in Northern Illinois*

Archaeologists have long explored the early interactions between Native Americans and Europeans in the Great Lakes region of Eastern North America. In particular, they have prioritized investigating these relationships at late prehistoric sites containing European trade goods. However, this narrow focus has led to neglecting late precontact sites that precede this period and which are essential for fully contextualizing these early interactions. In this presentation, we summarize the second year of ongoing excavations of the Middle Grant Creek (MGC) site at Midewin National Tallgrass Prairie in Wilmington, IL. This well-preserved, very late prehistoric Huber phase village expands our understandings of lifeways during the final period before European arrival. As one component of the broader Kankakee Protohistory Project, excavations at MGC refine existing understandings of Huber communities with particular focus on human-environment entanglements, mobility, and long distance trade. In this presentation, we summarize the geophysics, excavation, and ongoing analyses at MGC and contextualize the regional significance of the artifact assemblage, especially unexpected finds such as marine shell, painted pottery, and unique points. Conducted at one of the few single component sites in the region, this public archaeological project exposes the diversity of terminal prehistoric assemblages in ways that continue to unfold.

Schurr, Theodore [14] see Fleskes, Raquel

Schwadron, Margo (NPS-Southeast Archeological Center)

[247] *Engaging Community in Climate Change, Heritage Resource Management and Citizen Science: Examples from Florida's National Parks*

The National Park Service's core mission is to protect and preserve unimpaired for future generations natural and cultural resources under its management. Climate change presents unprecedented challenges as humans have set in motion an unstoppable sea-level rise that will eventually submerge, damage and destroy many heritage resources. Many sites are already undergoing severe erosion, and we struggle with prioritizing limited resources for protecting sites. What are our options? Using case studies from several Florida National Park units including Canaveral National Seashore's massive shell mounds; Everglades' millions of acres of wetlands, subtropical estuaries and prehistoric waterways interconnecting thousands of tree islands and shell work islands; Biscayne prehistoric earth middens; and Castillo de San Marco's fortifications, we illustrate various options for planning preservation of resources. A major success in protecting sites has been leveraging partnerships and engaging communities to participate in citizen science—enacting site protection measures, mitigation, ecosystem restoration, building living shorelines, and engaging locals of all ages in participating in heritage stewardship and resource management. These examples illustrate that despite sometimes difficult challenges, large sectors of the American public are eager, willing and ready to build a community of practice to help preserve, protect and understand threatened heritage resources.

Schwadron, Margo [111] see Hawthorne, Paige

Schwartz, Christopher (Arizona State University) and Andrew Somerville (Universidad Nacional Autónoma de México)

[21] *Local Origins, Distant Connections: Exploring Prehispanic Macaw Exchange through Radiogenic Strontium Isotope Analysis at Paquimé, Chihuahua, Mexico*

The prehispanic settlement of Paquimé (ca. 1200–1450 CE) lay at the intersection of traditionally-defined "Mesoamerican" and "U.S. Southwest and Northwest Mexico" (SW/NW) macro-regions in northern Chihuahua, Mexico. Extensive evidence of exchange with distant communities exists at the site, including remains of over 300 scarlet macaws; brilliantly plumed birds whose natural habitat is located at least 1000 km southeast in the humid lowlands of Mexico. Archaeological and historical records indicate these birds were ideologically and economically significant to SW/NW populations, one reason being their association with the rainy, agriculturally fertile lands of central and southern Mexico. Researchers have concluded that scarlet macaws discovered at Paquimé were largely fed and bred at the settlement, though dietary evidence suggests some birds were imported from distant, southern locations. This study employs radiogenic strontium isotope analysis on a sample of 30 scarlet macaws recovered at Paquimé to assess whether these birds were raised locally or imported. We find most 87Sr/86Sr values are consistent with baseline and local human 87Sr/86Sr values at the site, suggesting local origins, while eight individuals exhibit non-local values. We discuss several possible points of origins for these birds and consider the economic and ritual significance of this pattern.

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Schwarz, George (Naval History and Heritage Command) and Ben Ford (Indiana University of Pennsylvania)

[39] *Rebirth of the Schooner Royal Savage: Documenting and Interpreting Disarticulated Ship Remains from the American Revolutionary War*
The 70-ton schooner Royal Savage played a pivotal role as the flagship of Benedict Arnold's squadron in the American Continental Army's defense of Lake Champlain during the first year of the American Revolution. Misfortune led to her sinking during the Battle of Valcour Island in 1776, and the wreck was left largely undisturbed in shallow waters for over a century and a half until, in 1935, her remains were rediscovered and salvaged for exhibit in a museum that never materialized. Instead, the hull was disassembled and passed undocumented through several owners before being returned to the U.S. Navy in 2015 for preservation, documentation, and exhibit. Currently a disarticulated assemblage of deteriorated timbers, traditional and digital (LiDAR, photogrammetry) recording methods are being used to document, interpret, and reconstruct Royal Savage to better understand the design and use of this early and rare U.S. naval vessel. This presentation provides a brief history of the sinking and recovery of the hull and over 3,000 associated artifacts, the misguided transfer of materials over the course of 80+ years, and an overview of the current documentation and interpretation efforts—which aims to breathe new life into an old collection.

Schwenninger, Jean-Luc [41] see Frouin, Marine

Scott, Alyssa (University of California Berkeley)

[85] *Tuberculosis Sanatoriums: Historical Archaeology, Landscape, and Identity*

This paper examines the archaeology of the Weimar Joint Sanatorium, an institution which functioned as the county tuberculosis hospital for fifteen counties in California during the early twentieth-century. Field data from topographical survey, historic structures recording, geophysical survey, and surface collection are interpreted along with historical information in order to understand how the institution and people connected to it were situated within the larger landscape. Within the institution and surrounding communities, people navigated narratives about health, illness, disability, gender, race, ethnicity, age, class, and other forms of identity. Tuberculosis sanatoriums as a building type occupied a space midway between an institution and a domestic space, and tuberculosis sanatoriums consisted of a variety of building configurations, from dorms to private cottages. Archaeology can be used to understand narratives about the body and normative expectations which are embedded in the built environment and the landscape, and identifying these narratives is an important step towards destabilizing structures of inequality and stigma.

Scott, Ann (Terracon Consultants)

[289] *Discussant*

Scott, Tasia

[324] *Abandonment Processes in Manabi, Ecuador: Ethnoarchaeological Interpretations from the Cloud Forest*

The purpose of this research is to determine the manner in which site abandonment occurred in Manabi, Ecuador. The Manteño were one of many pre-Hispanic cultures exchanging local resources, engineering new technologies, and mass-producing goods along the coast of Ecuador. Successful in their chiefdom and independent from the expanding Inca Empire, the Manteño remained culturally uninterrupted for more than 800 years. The focus of this research is to understand the interruption and thus abandonment of the cloud forest. In order to understand abandonment processes in the Las Tucas valley, this research uses behavioral and contextual lines of evidence. Areas of activity are established by comparing soil chemical indicators (phosphate and pH), with ceramic analysis, and overall artifact distribution. Pre-abandonment behavior will then be examined within the social, political, and environmental context of the last occupation at site C4-044. The sum of this information will be further assessed in accordance with ethnohistorical perspectives from individuals whom participated in the abandonment of a modern day village in the cloud forest. This investigation supports a gradual and planned abandonment of site C4-044, with evidence for ritual abandonment.

Scott Cummings, Linda (PaleoResearch Institute, Inc.), R. A. Varney (PaleoResearch Institute, Inc.), Thomas W. Stafford Jr. (Stafford Research, LLC), Scott Anfinson (Minnesota State Historical Society) and Patricia Emerson (Minnesota State Historical Society)

[74] *Dates Too Old?: Mixed Carbon Reservoirs Integrate Carbon from Freshwater Reservoirs and the Atmosphere*

Sources of carbon in wetlands and calcareous areas represent unique challenges for interpreting the archaeological radiocarbon record. Atmospheric carbon dioxide is assumed to be the only carbon source for photosynthesis. However, dating modern and historic reference fish and modern reference wild rice indicates the presence of ancient carbon in bones and plant material. Dating four historic reference fish obtained from the Mississippi River in 1939 in southeastern Minnesota yielded four distinctly different dates that do not overlap. Instead, they span 1223 to 307 BP, leading to the conclusion that dissolved inorganic carbon (DIC) and perhaps other ancient carbon contributes to a freshwater reservoir affect. Trophic level of the fish (and their diet) is implicated in this date range since they were caught in the same river, probably during the same fishing expedition. Adding additional reference fish, including northern pike, caught elsewhere in the state returned differential offsets implicating geology and DIC as sources of ancient carbon. Wild rice harvested in 2015 yielded similar age offsets to the highest trophic level fish, suggesting both high trophic level fish and wild rice take in carbon from both the freshwater reservoir and the atmosphere. Implications for dating archaeological materials are discussed.

[289] *Discussant*

[74] *Chair*

Scott-Ireton, Della (Florida Public Archaeology Network), Jeffrey Moates (Florida Public Archaeology Network) and Nicole Grinnan (Florida Public Archaeology Network)

[78] *SSEAS of Change: Sport Divers, Heritage Monitoring, and the Future of Submerged Resources Management*

The growth and sustained popularity of scuba diving has resulted in increased visitation to historic shipwrecks and other submerged heritage sites. In Florida, one of the top diving destinations in the world, archaeologists and resources managers are concerned with the ongoing preservation of the state's underwater cultural heritage, both as heritage tourism attractions and as tangible parts of our common maritime heritage. The Submerged Sites Education & Archaeological Stewardship, or SSEAS, workshop was developed by the Florida Public Archaeology Network to train sport divers in non-disturbance recording techniques in order to engage divers in preservation ethics and methods, instilling a preservation mindset while developing teams of trained assistants for state managers. After several years of workshops, FPAN is using lessons learned and new strategies to adapt the SSEAS curriculum to the changing needs of both managers and divers, including advanced monitoring of sites, in situ preservation technology, and citizen science initiatives.

[233] *Discussant*

Seabrook, Melina [71] see Twiss, Katheryn

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Searcy, Michael (Brigham Young University), Scott Ure, Michael Mathiowetz, Jaclyn Eckersley and Haylie Ferguson
[68] *Aerial Imaging Using UAVs (Drones) in Chihuahua and Nayarit, Mexico, to Map and Archive Archaeological Sites*

In 2017, we used UAVs (drones) to record eight archaeological sites from the air. As this type of technology becomes more refined, we have found that it is especially useful in carrying out three specific tasks: contour mapping, archiving site conditions, and identifying architecture. This paper reports our findings resulting from aerial images captured while flying archaeological sites in Nayarit and Chihuahua, Mexico.

Searle, Jeremy [125] see Hulme-Bearman, Ardern

Sears, Erin (University of Kentucky/Smithsonian Institution)
[139] *The New Adventures of Old Ceramic Figurines from Tres Zapotes, Mexico*

The long-term exploration of Formative fluorescence within the Veracruz region of Mexico has been supported through mid-20th century archaeological excavations and collection management protocols of the Smithsonian Institution's Natural History Museum Department of Anthropology. The Olmec site of Tres Zapotes has been a focus of archaeological investigation since 1938 by Smithsonian's Bureau of American Ethnology Director, Matthew Stirling. Research at the site continues to explore the regional diversity as currently carried out by Christopher Pool and team members from the University of Kentucky. This report concerns the use of miniature ceramic figurines as a focus for understanding variation using current and previously excavated material. Through the use of technical studies, archives and comparative methods, interpretive benefits of incorporating museum collections with data emerging from current research are discussed.

Sebastian, Lynne (SRI Foundation)
[233] *Discussant***Sedig, Jakob (Harvard University)**
[97] *An Archaeologist amongst Geneticists: Overview of My Experiences as an Archaeologist in an Ancient DNA Laboratory*

In this paper, I provide insight on the field of ancient DNA (aDNA) analysis from my unique perspective as an archaeologist employed in a leading aDNA laboratory. Ancient DNA research has advanced so much that genomic data from thousands of individuals across the globe are now available for study. These data are allowing geneticists and archaeologists to conduct studies that provide new insights into migration, demographic transitions, and relatedness of ancient individuals. They also afford an entirely new dataset to examine longstanding archaeological questions. While aDNA analysis is having a significant impact on interpretation of the past, due to the very rapid growth and development of the field, archaeologists might find themselves falling behind on increasingly complex methods and numerous publications. Thus, I provide a brief overview on the process of aDNA research. Additionally, this paper addresses some of the recent controversies in aDNA studies, such as "sample hoarding," the seeming focus on European samples, and ethical issues surrounding aDNA analysis. Finally, while there certainly have been many fruitful collaborations between archaeologists and geneticists, there have also been disagreements about results and data interpretation. I therefore also examine how archaeologists and geneticists can better collaborate in future research.

Sedig, Jakob [91] see Gilman, Patricia

Seeley, Sarah, Jonathan Reeves, Matthew Douglas and David R. Braun
[99] *Lithic Taphonomy and Digital Hydrogeologic Models: A GIS Based Approach to Understanding the Formational History of Surface Assemblages*

Surface assemblages play an important role in understanding human behavior. However, modern erosional processes—specifically flowing water—can limit the behavioral inferences that can be gained from surface assemblages by transporting materials from their original discard sites. The influence of these processes can be observed in the size distribution and condition of surface lithic assemblages. The topography and geomorphology of the landscape heavily dictates the degree to which fluvial processes erode and redistribute artifacts. Thus, considering formation processes alongside aspects of topography and geomorphology provides a means to investigate the extent to which modern geomorphological processes have altered surface assemblages. Here, we use digital terrain analysis to explore this relationship between the surface assemblages and modern erosional processes. We characterize the location of surface artifacts from the Koobi Fora Formation, Kenya, by stream power (erosive potential) and topographic wetness (the potential for water to pool). We then pair these data with attributes of stone tools that reflect post-depositional damage. We assess the overall influence of hydrological processes on the spatial arrangement of surface assemblages. A discussion of the applied methods and preliminary results is presented. This research was supported by the U.S. National Science Foundation, OISE awards 1358178 and 1358200.

Seeman, Mark [74] see Nolan, Kevin

Séguy, Isabelle [302] see Granados Vazquez, Geraldine

Seibel, Scott (AECOM) and Christopher McDaid (Joint Base Langley-Eustis (Eustis))
[42] *Managing the Effects of Erosion and Sea Level Rise on Archaeological Sites at Fort Eustis, Newport News, Virginia*

Fort Eustis, part of Joint Base Langley-Eustis, located on Mulberry Island along the James River in Virginia, is extremely vulnerable to the threat of erosion resulting from sea level rise, increased tidal range, and flooding from increased rainfall and storm surge. Currently, dozens of archaeological sites on the island are experiencing damage resulting from erosion, including sites where human remains have been found protruding from erosional scarps. To meet the installation's short and long-term planning needs and their regulatory obligations under the National Historic Preservation Act, the Fort Eustis Cultural Resources Management Program implemented a study of the effects of sea level rise and shoreline erosion on 31 threatened archaeological sites at Fort Eustis. The interdisciplinary study involved archaeologists and coastal engineers from AECOM and examined historic and current erosion rates and future sea level rise projections, conducted site visits, developed comprehensive risk assessments, evaluated of current and long-term threats, and generated potential management strategies. The installation currently uses the data from the study to establish priorities regarding which sites to evaluate for significance, to develop cost estimates, and to aid when deciding whether to protect a site or to conduct data recovery.

Seibert, Michael [154] see Elliott, Daniel

Seidemann, Ryan (Louisiana Department of Justice)
[62] *Discussant*

Seidemann, Ryan [107] see Halling, Christine

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Seidita, Max (Brandeis University) and Charles Golden (Brandeis University)

[163] *The Economic Relationships of Epicentral and Peripheral Households at Piedras Negras, Guatemala*

More than half a century of archaeological and epigraphic research at Piedras Negras has produced one of the best understood epigraphic corpus in the Maya region and provided archaeologists with a plethora of information related to the nature of rulership, courtly life, and the regional political landscape of the Classic Period. Despite this work, questions persist about the economic structure of Piedras Negras households. Here we present the results of recent investigations undertaken at Piedras Negras and situate them in the context of earlier research at the site and its hinterlands, to better characterize the relationship of epicentral economic infrastructure and near-periphery residential occupation through the lens of the house and household. Particularly, we explore the relationship of residential economies to larger-scale economic processes in the kingdom.

Seif, Assaad (ICOMOS / ICAHM Expert Member)

[145] *The Doctrine for Management of Archaeological World Heritage Sites, the Case of Some Selected Sites in Lebanon*

The Salalah Doctrine regarding the management of archaeological world heritage sites seeks to recognize the differences between archaeological sites, standing monuments and landscapes. Consequently, new and adapted management approaches to the Archaeological sites that present distinct management challenges are needed. The ICAHM doctrine proposed strategies for sustainable conservation and preservation still need to be addressed critically and contextually to ascertain their applicability. Aiming to further contribute to the discussion, this paper proposes to present case studies from specific sites in Lebanon.

[145] *Discussant*

Seikel, Katherine (AmaTerra Environmental; Australian National University), Rachel Feit (AmaTerra Environmental, Inc.) and Jon Budd (Texas Department of Transportation)

[44] *A Greasy Mess: Reconsidering Prehistoric Bone Grease Extraction and Its Implications for Site Interpretation*

Ethnohistoric accounts and archaeological evidence show that North American Indigenous hunter gatherers utilized fats and oils rendered from smashing and boiling faunal bone for dietary and other uses. In the archaeological record, evidence of bone grease extraction is interpreted from fractured faunal remains recovered from midden deposits and thermal features. However, most archaeological studies of bone grease extraction tend to focus on subsistence to the exclusion of other uses. This preoccupation with subsistence has often led to formulations of indigenous lifeways as pure response to environmental conditions. Most notably, the idea that prehistoric bone grease processing was a response to resource stress is a topic of vigorous discussion.

Archaeological studies of bone grease processing have mostly overlooked its other uses. For instance, bone grease was commonly mixed with ocher, charcoal, and other minerals to make grease paint for decorative, ritual and medicinal uses. Our review of ethnohistoric literature coupled with archaeological data from sites in Texas shows a strong correlation between pigment minerals and bone grease processing. This has important implications for how bone grease processing locales are understood, indicating that the rendering of grease had a function in social life that went well beyond subsistence.

Sekaquaptewa, Susan [218] see Young, Lisa

Selden Jr., Robert [90] see Manzano, Bruce

Seligson, Ken (University of Southern California), Soledad Ortiz Ruiz (Universidad Nacional Autónoma de México) and Luis Barba Pingarrón (Universidad Nacional Autónoma de México)

[177] *Prehispanic Maya Burnt Lime Production: Previous Studies and Future Directions*

Burnt lime has played a significant role in daily Maya life since at least as far back as 1100 BC, and yet its ephemeral nature has limited archaeological studies of its production and distribution. The application of new surveying and remote sensing technologies in recent decades is now allowing for a more in-depth investigation of the burnt lime industries that existed in different sub-regions of the Maya area. In this talk, we present an overview of the current understanding of Prehispanic Maya burnt lime production, including recent identifications of lime kilns in the northwestern Yucatán peninsula. We also discuss the broader socio-economic and resource management issues to which burnt lime production studies have the potential to contribute.

Seligson, Ken [18] see Ringle, William

Sellen, Adam (Universidad Nacional Autónoma de México)

[206] *Where Have All the Collections Gone? Mexican Archaeology in World Museums*

In the second half of the nineteenth century, before the era of professional archaeology, those interested in the evidence of the past collected, and on an unprecedented scale. Most of these massive holdings have been since acquired by public museums around the world, where they have been co-mingled with other collections, and in the process, objects have been severed from their historic moorings. Focusing on Mexican collections, this talk looks back on a decade of work in museums and archives to recuperate a dispersed archaeological record, presenting an overview of the evidence and the lessons learned from its analysis.

Sellers Wittie, Kelly [90] see Coughlin, Sean

Sellet, Frederic (University of Kansas) and Michael Guarino (University of Kansas)

[120] *Miniature Folsom Points from the Lindenmeier Site, Colorado*

Among the Folsom artifacts excavated by Frank Roberts at the Lindenmeier site in Colorado are several unusually small projectile points, both fluted and unfluted. This paper explores the hypothesis that these miniature points are toys. To do so, we review the ethnographic literature on miniature weapons and contextualize the production and use of such objects. Second, we compare the small Folsom artifacts to full-size points from a typological and technological point of view. Finally, we discuss their spatial distribution relative to other evidence of weaponry manufacturing activities.

Seltzer, Heather (University of Colorado Boulder)

[325] *Cultural Icons: Understanding Social Identity through Iconography in the Contact Era Pueblo World*

The arrival of the Spanish shattered the Pueblo people's worldview in the Rio Grande during the 16th century. Nevertheless, the Pueblo people held onto specific icons that socially identified them as Pueblo, while yet creating Spanish commissioned pottery and other Spanish materials. The 1680 Pueblo Revolt and cultural revitalization movement by Puebloan groups sought to return indigenous peoples to their heritage through an emphasis on traditional religious practices and lifeways. Using iconography on historic pottery, this paper will explore the ways social identity can be maintained yet transformed in situations of intense cultural contact. I compare motifs on pots from the Northern and Middle Rio Grande, dating from the pre-Contact through post-Revolt period. These areas experienced different degrees of colonization which is evident in the degree to which indigenous or Spanish linked motifs occur on pottery.

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Semon, Anna (University of North Carolina)**[266]** *A Comparison of Late Mississippian Complicated Stamped Designs from the Georgia Coast*

Complicated stamped pottery dominates Late Mississippian (AD 1300–1580) ceramic assemblages on the Georgia coast. The most prolific design is the filfot cross, which is symmetrical and comprised of four basic elements. Although the overall filfot design does not change, the basic elements can differ to create unique combinations that can be used to track filfot variation and paddles. In this poster, I present the methods and results of a complicated- stamped pottery study, which tracked filfot cross design variations from several Late Mississippian sites on the Georgia coast. These data expand our knowledge of Late Mississippian artwork, woodcarving technology, pottery practices, and coastal social interactions.

Semon, Anna [154] see Edwards, Alexandra

Semple, Sarah [40] see Buchanan, Brian

Seowtewa, Octavius**[72]** *Discussant*

Serneels, Vincent [32] see Kienon-Kabore, Timpoko Hélène

Serra, Margot, Jakob Hanschu, Amandine Flammang and Danielle Kurin**[270]** *Using Parry Fracture Data to Further Assess Violence in Andahuaylas during the Late Intermediate Period*

Previous studies of crania showing recurrent trauma suggest high rates of violence in the Andahuaylas province of Peru during the Late Intermediate Period. Through an assessment of direct blow fractures to radius and ulna bones (lower arm bones), we further examined violence in the region, anticipating a high rate of parry fractures. The skeletal remains assessed come from Sonhuayo, a fortified habitation sector of Cachi, a Chanka site in the west-central portion of the Andahuaylas province. Since crania from the site were formerly investigated, locations and types of cranial trauma and parry fracture data can be synthesized to further define the methods and frequency of violence in Andahuaylas during the LIP. Indeed not all types of violence result in parry fractures. De factor our study determined rates of parry fractures to be quite low, while cranial trauma reflects frequent injury. The results suggest that close, defensible hand-to-hand combat was not the primary means of administering violence.

Serra Puche, Mari Carmen (IIA-UNAM)**[262]** *La Interaccion regional de Xochitecatl-Cacaxtla durante el Formativo en el valle Tlaxcala-Puebla. 800 a.C.—200 d.C.*

El surgimiento del Centro Regional de Xochitecatl-Cacaxtla tiene sus orígenes en los primeros asentamientos aldeanos del Valle de Tlaxcala, la elección del lugar donde se construyó se debe a la ubicación estratégica entre los ejes de los volcanes que rematan el valle reconstruyendo un paisaje sagrado y también por el acceso y control de las rutas de intercambio con la cuenca de México, el Valle de Morelos y el Golfo y Oaxaca.

Su área de interacción y control fue cambiando en el Transcurso del tiempo, gracias a la identificación de varios niveles de relación con los asentamientos cercanos en el valle de Tlaxcala, la presencia de tipos cerámicos y otros indicadores arqueológicos nos señalan el control económico y político de la región.

Sin embargo, debemos explicar también la interdependencia con los asentamientos más cercanos y con otros centros regionales contemporáneos como Tlalancaleca y La Laguna, resultado de un sistema político de interacción interregional característico de los Altiplanos centrales.

Serrano, Victor (University of Leicester)**[140]** *In the Hunt for Mona Island Guano Miners: Archival Documentation in the General Archives of Puerto Rico*

This paper presents initial archival research from the “Archivo General de Puerto Rico” (Puerto Rican General Archives) relating to C19th-20th guano extraction on Mona island in the Caribbean. This is part of a PhD project which examines the lives of guano miners through archaeology and historic archives. Guano as a manure was highly sought as a fertilizer during the nineteenth century for its high contents of nitrogen, phosphate and potassium, nutrients needed for plant growth. It revolutionized farming practices across the world and catalyzed the colonization of remote islands with the intent of mining them. Very little is known about the daily experiences, regimes, and identities of guano miners on Mona Island, part of the Puerto Rican archipelago. Guano extraction started in Mona Island around 1854 under the Spanish government and lasted until 1936 under the USA government. During this period multiple international companies operated on Mona Island, relying on the manual labor of hundreds of workers. An examination of the lives of guano miners on Mona island is important to understand the hidden histories of itinerant laborers across the Caribbean post-emancipation, but also to shed light on the human story of modern industrial capitalism more widely.

Setalla, Gwen [218] see Young, Lisa

Sexton, Joe (Yakama Nation / Galanda Broadman PLLC)**[253]** *Reflection on Jelderks' Judicial Decision and the Ninth Circuit's Decision in the Bonnicksen Litigation*

The Bonnicksen litigation commenced shortly after the discovery of the Ancient One's (aka Kennewick Man) remains and involved several scientists suing the United States to keep the remains and use them for their claimed scientific purposes. Judge Jelderks, Magistrate Judge for the United States District Court in Oregon, found in favor of plaintiffs in 2002. His decision advances a skewed analysis of NAGPRA cultural affiliation claims that hinders tribal rights and serves as a deterrent for meaningful government-to-government consultations between sovereign tribes and their trustee, the United States. The U.S. Court of Appeals for the Ninth Circuit upheld Judge Jelderks' decision in a far more limited opinion published in 2004. I will focus on (1) Judge Jelderks' analysis, (2) how this decision impacted tribes' advocacy for repatriation of the Ancient One under NAGPRA, (3) how it may impact future tribal advocacy for repatriation, (4) the Ninth Circuit's more limited analysis, and (5) what a proper preponderance analysis of cultural affiliation claims should look like under NAGPRA, consistent with the statute and federal common law precedent on a preponderance burden of proof.

Sexton, Clayton [286] see Simon, Katie

Seymour, Deni**[131]** *Whenever the Twain Shall Meet: Merging Ethnohistorical and Archaeological Data*

Data sources, including documentary and archaeological, represent rich caches, full of mundane descriptions and an occasional succulent morsel that adds to the richness of our understanding of the past or potentially changes those understandings in fundamental ways. Yet facts are situated in frameworks of conventional wisdom, existing reconstructions, methodological practice, and extant data. Many substantial advances effectively and critically combine the particular with the generalizable, recognizing that humans respond in a predictable set of ways given similar parameters. Our work is to understand the variations and exceptions, the boundary conditions, the richness of the cultural overlay, and the effects of time and interaction on more generalizable behavior. Yet, archaeologists and ethnohistorians use data sources in different ways, establishing the question as to whether

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twain shall meet. Some methodological differences relate to how one selects or weighs documents, and parts, passages, or elements therein, (2) assumptions as to clarity of meaning and soundness of translation, (3) the use of external evidence to assess interpretations, and (4) willingness to cede authority to other sub-disciplines. Apachean and O'odham examples are used to explore these issues and to assess effective tools, such as correlate grids, for reconstructing the past using all applicable data.

[191] *Discussant*

Sezate, Adam (University of Arizona/ Pima County OSC), Courtney Rose (Pima County, Arizona), Ian Milliken (Pima County, Arizona) and Roger Anyon (Pima County, Arizona)

[72] *A Local Government and Tribal Collaborative Approach to Cultural Resources Management*

The Pima County (Arizona) Office of Sustainability and Conservation is applying a proactive approach to cultural resources management on approximately 100,000 acres of Conservation Lands the County has recently acquired for conservation purposes. County stewardship and management of these lands brings with it several responsibilities, among them developing a management plan through collaboration with Tribes that guides 1) the identification of Traditional Cultural Properties, 2) monitoring of current and future agents that may impact Traditional Cultural Properties, 3) determining strategies to mitigate impacts to Traditional Cultural Properties. Prior to writing a management and monitoring plan, Pima County began collaboration with several Tribes that have ancestral ties to the Conservation Lands, by holding a series of meetings with each of the Tribes. These consultations documented and assessed the level and focus of Tribal interest, concerns, and needs. This means that Tribal concerns and perspectives are incorporated into planning, fieldwork, documentation, and management protocols. Each of the Tribes observed that this type of proactive approach to cultural resources management is especially valuable. This provides Tribes an opportunity to have meaningful input during both the plan's formulation and implementation.

Sgarlata, Cosimo [294] see Singer, Zachary

Sgheiza, Valerie and P. Willey (California State University, Chico)

[179] *Demography of Skeletal Remains from Point San Jose*

A critical question concerning the Point San Jose (PSJ) skeletal remains is the nature of the living population from which the assemblage was derived. We approach this issue indirectly through comparison with other mortality profiles. Here, we report the age, sex, and ancestry of the PSJ skeletal remains, and compare them with those parameters of other groups. The comparative age distributions consist of the 1870 California mortality census, 1870 California living census (as a proxy for a catastrophic population), mortality data from California military regulars, a hospital distribution, and a prehistoric distribution. The PSJ age distribution shows significant differences from all those groups except the hospital distribution. The PSJ sex ratio (approximately 3 females: 4 males) demonstrates similarities with the 1870 California mortality census. Ancestries present in the PSJ skeletal series indicate that Asian or Asian-related individuals equaled the number of European-derived ones, contrasting with the 1870 California mortality census. That mortality census consists of many more deaths among European-related people than Asian or Asian-related ones. Such exclusionary testing allows us to draw inferences about the selection processes at work in incorporating individuals into the PSJ assemblage.

Sgheiza, Valerie [179] see Cox, Maria

Shable, Jamaludin [268] see Rawan, Atifa

Shaffer Foster, Jennifer (Medaille College)

[85] *Healing Places and Objects in Irish Archaeology*

The concept of healing—in any time period—has received relatively little attention in Irish archaeology. While bioarchaeologists have examined ailments and injuries in prehistoric and historic Irish populations, discussion and understandings of how, why, and where people sought treatment, and which treatments were deemed successful, remain elusive. This paper will draw on Gesler's (1992) concept of therapeutic landscapes, most commonly utilized in health geography, in order to examine healing places and material culture in post-Medieval and Historic Ireland. Historical and ethnographic accounts provide an extensive source material on widely used healing concepts integrated into uniquely Irish cultural and physical landscapes, such as visits to spas, sweat houses, holy wells, and rag trees. These and other places where people went to be treated by practitioners or healed through interaction with the built environment, natural world, or supernatural beings often survive as recognized sites today, and their position vis-à-vis contemporary domestic and ritual landscapes will be explored in order to gain a more nuanced understanding of healing in archaeological and historical contexts.

Shakour, Katherine (University of South Florida)

[296] *Choosing Building Materials: Multi-scalar Construction of Identities and Heritage Following Disaster*

Scholars and communities have been discussing ownership of the past for the last few decades, and they have explored ways in which social and political movements empowered communities to reclaim ownership of their heritage. These communities use archaeology and material culture to construct their heritage. However, few scholars have discussed how communities are constructing heritage with respect to disasters and social upheaval. This paper explores the multi-scalar construction of heritage and identity through material culture and archaeology in a post-colonial and post-disaster environment. Through a case study in Ireland, I explore heritage construction motivations and techniques following the Great Famine and the fight for independence through the present day. I compare heritage and identity on a national scale to a regional scale in County Galway and a local scale on Inishbofin, an Atlantic island off the western coast of Ireland. The examination of multi-scalar heritage compares uses of the past following the suffering, death, and mass migration of over a million Irish people. This paper sheds light on how small communities construct their identity with material culture, discusses the disparities between various scale of heritage in post-disaster and post-colonial environments, and explores the consequences of those differences.

Sharma Ogle, Mini (Portland General Electric)

[268] *'Powering the Future while Protecting the Past'- Cultural Resource Matters at an Electric Utility*

Portland General Electric has embarked on a cultural management stewardship program to elevate its responsibility towards its historic resources, including hydro-electric plants, traditional cultural properties, and even a company town. This poster will discuss some of the creative solutions PGE has developed in an effort to balance its needs to generate safe and reliable electricity while protecting cultural resources in its service territory.

Sharon, Gonen [71] see Berger, Uri

Sharp, Emily (Arizona State University)

[94] *Confronting Popular Perceptions of a Violent Past: Active Learning Strategies for a Large Introduction to Archaeology Course*

One goal of archaeological pedagogy is to make students question assumptions about "progress" and the relationship between modern human beings and their historical ancestors. One persistent idea is that violence has declined over time, which coupled with stereotypical illustrations of the past as

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particularly savage, influence how students conceptualize violence today. Developing teaching strategies that ask students to confront popular assumptions about violence can be difficult in introductory classes with enrollment of several hundred students. This presentation will describe two examples of implementing active learning strategies about these topics in an introduction to archaeology course at Arizona State University. Engaging students in small group activities within a large, lecture-based class included strategies such as think/pair/share and write/pair/share. Each activity prompt will be presented, along with a discussion of student feedback and suggested future modifications. The activities gave students hands-on experience with archaeological data and incorporated discussions of past violence in the media and popular science writings. Students were required to evaluate the data based on a set of given parameters to help develop critical thinking skills. By contextualizing modern perceptions of past violence around actual archaeological data, this encouraged students to become better informed consumers of archaeology.

Sharp, Emily [211] see Grávalos, M. Elizabeth

Sharp, Kayeleigh (Southern Illinois University Carbondale)

[141] *Beneath the Surface: Steps toward Resolving Gallinazo-Mochica Debates in Peru's Northern North Coast*

Understanding the role of the widespread yet under-recognized art style known as Gallinazo, its persistence alongside the more conspicuous Mochica art style, and the social factors that facilitated their long-term coexistence on Peru's North Coast during the first millennium, are primary concerns of this work. Investigation of the Songoy-Cojal site in the mid-Zaña Valley shows that Gallinazo-Mochica coexistence persisted at least until the 8th century CE (based on new C-14 dates). Many problematic assumptions concerning the role of the Gallinazo (e.g., culture, political or non-cultural entity), however, have emerged in recent decades, resulting from the widespread adoption of conventional stylistic and art historical interpretations. In this paper, I operationalize a new practice-based approach which combines concepts of technological style and technological choice, to explore more meaningful dimensions of these artifacts. Combining techno-stylistic, metric and archaeometric (pXRF and NAA) data, and social network analysis (or SNA) techniques, this work takes several steps toward resolving debates over the nature of Gallinazo-Mochica coexistence. Herein, I present new perspectives on the nature of Gallinazo multi-craft production from various work-related activity settings at Songoy-Cojal, finding that long-standing dichotomies between these two distinct stylistic traditions are far more superficial than previously thought.

Sharpe, Ashley (Smithsonian Tropical Research Institute), Kitty Emery (Florida Museum of Natural History, University of F) and John Pfeiffer (Florida Museum of Natural History, University of F)

[217] *Bringing Two Halves Together: Combining Modern Phylogenetics and Zooarchaeological Analysis to Understand Past and Present Trends of Freshwater Mussels (Unionidae) in Mesoamerica*

For over a century, the taxonomy of the Central American freshwater mussels (family Unionidae) has been the subject of numerous classifications and reclassifications, with naturalists identifying morphologically identical taxa as different genera or species, while at the same time classifying obviously distinct taxa under the same name. Zooarchaeologists at the mercy of these erratic classification schemes have been unable to effectively compare datasets. This study uses a combined zooarchaeological and molecular phylogenetic approach to identify both the ancient and modern freshwater mussels in Guatemala's Pasión River. Modern mussels were surveyed and collected near the archaeological site of Ceibal and then tested to understand their molecular phylogeny. Phylogenetic results were used to identify the archaeological shells spanning the site's history (1000 BC to AD 1000). Field data gathered on the live mussel biology, and interviews with the local residents familiar with the mussels, were used to produce a comprehensive understanding of how the different taxa may have been gathered and used by the ancient Maya. Results indicate that some taxa present in the river today were rare or entirely absent in the past, while certain taxa commonly found at Ceibal millennia ago cannot be found today.

Sharpe, Ashley [299] see Elvir, Wilmer

Sharratt, Nicola (Georgia State University)

[141] *Tradition and Transformation during the Middle Horizon to LIP Transition: Visual and Compositional Analyses of Tumulaca and Estuquiña Pottery in the Moquegua Valley, Peru*

In many Andean regions, the shift from the Middle Horizon to the Late Intermediate Period, or LIP, is archaeologically identified by stylistic changes. In the Moquegua valley, southern Peru, LIP (ca. AD 1250–1476) Estuquiña architecture and portable material culture is starkly different from that associated with terminal Middle Horizon (ca. AD 950–1200) Tumulaca populations. Until recently Tumulaca settlements were thought to have been completely abandoned prior to the appearance of Estuquiña styles. Incorporating both visual analyses of and compositional derived from LA-ICP-MS analyses of Tumulaca and Estuquiña pottery, I complement the long recognized stylistic distinctions by examining the transformation of productive practices and the organization of ceramic production as Moquegua underwent processes of population replacement and cultural change. Drawing in particular on material from Tumulaca la Chimba, a site with an Estuquiña occupation partially superimposing a Tumulaca occupation, I propose that the ceramic data suggest a more nuanced and complex picture of the transition from the terminal Middle Horizon to the LIP which, in tandem with new radiocarbon dates and excavation data, challenges the assumed temporal break between terminal Middle Horizon and LIP occupations in Moquegua and instead raises the possibility of a period of social interaction between communities.

Sharratt, Nicola [270] see Schaefer, Benjamin

Shaw, Justine (College of the Redwoods)

[173] *Sacbeob in the Cochua Region: Barriers or Links?*

During the Terminal Classic, sacbeob were built at three Maya sites in the Cochua region of west-central Quintana Roo, Mexico. The roads provided a physical connection between portions of Ichmul, San Felipe, and Yo'okop, running between important structures, out to outlying groups, and even to what had likely been separate settlements. Although they would have been used for processions between termini and may have had numerous symbolic meanings, the impact of some of the roadways on the lives of commoners may have instead been that of impeding the flow of transit. An examination of the contexts, features, and physical forms of these roadways shows how, rather than necessarily easing transit in the manner of most modern roads, some sacbeob were set apart as sacred space no longer available for quotidian functions. In contrast, other causeways seemed to be designed to welcome public access, providing for the ready flow of foot traffic along and across their spans. This difference, related to the intended function, reveals another way in which what archaeologists consider to be one feature class may have been conceived of as multiple categories by residents.

Shaw, Philip [217] see Sykes, Naomi

Shaw-Müller, Kyle [82] see Walden, John

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Sheehan, Beth (University of Illinois at Urbana-Champaign)**[222]** *The Influence of Journal Publishers on Archaeology Data Sharing*

Journal publishers are poised to influence and be influenced by disciplinary attitudes toward data sharing. A previous study of the relative strength or weakness of data sharing policies in journals that publish gene microarray expression data (Piwowar and Chapman, 2008) found that stronger data sharing policies are generally associated with higher journal impact factors and an increased percentage of articles with shared and available data. In fact, even the presence of a “weak” policy increased data sharing, as compared to journals with no data sharing policy. This poster presents the summarized findings of a similar review conducted in 2017 that examines the presence/absence and relative strength of data sharing directives from the top 50 archaeology journals (as ranked by the 2016 Scimago Journal Rank indicator scores). The results reveal a snapshot of the current state of the archaeology discipline’s data sharing attitudes as reflected in the culture of archaeology publishing and scholarly communication, and inspire discussion about the potential benefits and drawbacks of publisher-encouraged or mandated data sharing in this discipline.

Sheets, Kimberly (Washington State University)**[187]** *Understanding Changes in Lagomorph Proportions within the Homol’ovi Settlement Cluster, Northeast Arizona*

Lagomorphs (rabbits and hares) were a critically important dietary resource for inhabitants of the pre-contact American Southwest, where they typically dominate faunal assemblages. It is useful to examine proportions between genera of lagomorphs—specifically, cottontails (*Sylvilagus* sp.) and jackrabbits (*Lepus* sp.)—to elucidate information about the past environment and how it might have changed in response to human actions. Based on habitat preferences and predator evasion strategies, the lagomorph index is a useful tool for examining this relationship and tracking how the environment might have changed throughout time. This poster examines changes in the lagomorph proportions through time within the Homol’ovi Settlement Cluster, a group of five Pueblo IV villages occupied at various points between AD 1260 and 1400. Results show an increasing reliance on cottontails over jackrabbits through time. The implications of this trend are discussed through optimal foraging theory.

Sheets, Payson (University of Colorado) and Christine C. Dixon**[173]** *Constructing the Social Fabric of a Community: Household Service Relationships to the Ceren Village*

Volcanic preservation allows for detailed reconstructions of a variety of social relationships and material boundaries at Ceren. Service relationships are inferred from proximity of households associated with special-function structures, such as the religious complex, the sauna and the community governance center. These data show a social function of providing service relationships from each household to the community. Socioeconomic functions are also evident in the form of other specializations, one household producing specialty crops, another with spindle whorls for fine threads and groundstones, and another for painted gourds. The interpretation of evidence from Cerén documents the division of household groups into social units responsible for different economic needs within the community, which wove a deep fabric of social interaction. Physical markers of the Cerén landscape formed boundaries, agricultural fields separated by crop type, a sacbe and drainage canals dividing fields and providing transition from the border of the site center into the manioc field south of the community, and notably a large adobe block demarcating a division of space between fields, likely related to ownership. Such evidence from Cerén provides the rare opportunity to examine in detail the social obligations and physical divisions of a Classic Maya farming community.

Sheets, Payson [142] see Dixon, Christine C.

Shellenberger, Jon (Native Anthro)**[255]** *The Original Cultural Resource Managers of America: Going beyond Integrating Native Perspectives in Cultural Resource Management*

The perspectives of Native Americans within the field of archaeology can no longer be tossed aside. Native Americans have placed special cultural significance on archaeological resources long before 1492. The relationship between Archaeology and Native Americans is well-known to be a tumultuous one. The integration of Native American perspectives on the management of resources significant to tribes has been a continuum of paternalism and racial segregation. Archaeologists are in a rare position to perform great services, as well as great harm to significant Native American archaeological resources. The integration of Native perspectives within cultural resource management has been rewarding for all parties and expand our scientific understanding of human land use through time. This will force us to challenge existing biases and break down barriers to entry for Native American participation. In addition, a more diverse and holistic approach will provide different opportunities to resolve issues within the framework of existing laws and identify where changes need to be made in their application.

Shelton, China [298] see Allen, Susan

Shen, Chen [24] see Cheng, Wen Yin

Shen, Dewei (Yale University)**[24]** *Inscribing Behaviors on Oracle Turtle Plastrons: A New Method to Analyze Tributary Networks of Late Shang China (c. 1250 BCE–1046 BCE)*

Processed from turtle shells and bovid scapulae, oracle bones were massively exploited by the ruling house of the late Shang Dynasty for divination. As opposed to traditional scholarship that holds primary interest in inscriptions engraved on these bones, I consider late Shang divination in entirety as a technological process that proceeds from the preparation and delivery of bone material via tributary networks all the way to bones’ after-use discard into pits. By switching the attention to the least examined pre-divination and post-divination stages, I focus on the texts of marginal inscriptions, the data of the used turtle plastrons and the records of stratigraphy recovered from Pit YH127 and Pit H3 at Yinxu. I argue that since regional tribute payers, capital scribes and diviners were made bound by the tributary networks of oracle turtles, their major behavioral patterns that aimed to facilitate the provision of turtle shells for divination would have been “recorded” by the altered materiality of the shells at each step of change. To detect and reconstruct such behavioral patterns and the physicality of divination can deepen our understandings of the groups that attended the industry of oracle bones, and thus the nature of oracle bones as well.

Shennan, Stephen**[137]** *Dates as Data: Where Are We Now in Using Radiocarbon Dates to Infer Population Histories?*

Archaeologists have long used site counts and other measures to infer past population histories and such efforts have always been criticised by those who point to all the known and unknown unknowns that in their view make such efforts as dubious as getting to the topmost steps on Hawkes’s ladder of inference. In recent years most effort has been devoted to the use of summed radiocarbon probabilities for demographic inference since for most of later prehistory in most of the world it gives a much higher degree of chronological resolution than any alternative, resulting in many cases in a qualitatively new view of population patterns, which have turned out to be characterised by booms and busts. To overcome the many obvious problems to using radiocarbon dates in this way a great deal of effort has been devoted to the development of rigorous methods combined with large-scale data collection. The methods involve either building and testing specific models of population change through time, for example exponential growth, or

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comparing patterns in different data sets by means of permutation tests to see if they are significantly different from one another. The methods, criticisms and ways forward will be described.

Shennan, Stephen [29] see Schauer, Peter

Shepard, Lindsay (University of New Mexico)

[269] *Assessing the Effectiveness of Various Scanning Technologies in Digitally Capturing Fingerprints on Corrugated Wares*
Methodological advances in the study of fingerprints by criminologists have revived an interest in using dermatoglyphic evidence to conduct archaeological research. The analysis of fingerprint impressions left in ceramics is being used to investigate topics such as craft specialization and social organization. While most impressions left in ceramics lack the completeness needed to identify individual potters, fragmentary prints can be used to analyze things such as ridge density. Given a large enough sample size, the analysis of ridge density can be used to determine the sex ratio of potters, information that can be applied towards many lines of archaeological inquiry. As an initial step in conducting ridge-line analysis, I test four surface scanning technologies (NextEngine and HDI Advance 3D scanners, a Dino-Lite digital microscope, and photogrammetry) to determine which will produce images most conducive to performing such an analysis. Consideration is given to multiple factors, such as image resolution, ease of use, processing time, and the cost of operation. Gray wares from Chaco Canyon, New Mexico are used to conduct the analysis.

Shepardson, Britton L. [101] see Sullivan, Kelsey

Shepard, Christopher (College of William and Mary) and Martin Gallivan (College of William and Mary)

[328] *Persistent Places, Enduring Objects: Ritualized Spaces and Things in the Powhatan Political World*
Seventeenth-century colonial chroniclers repeatedly mention a series of places and objects that surrounded political negotiations and efforts at alliance-building by Powhatan societies. While regional scholarship has focused on competition over subsistence resources, regional trade dynamics, and the regulated exchange of “prestige goods” as central to the development of these political structures, we shift the focus toward the engagement between these societies and specific places and objects whose enduring legacies spanned multiple generations. We argue that the development of the seventeenth-century political geography was predicated on the maintenance of persistent ritualized spaces and the circulation of enduring objects whose shifting meanings connected the past and present, bolstered political structures, and facilitated the transfer of power from one generation to the next. Archaeological evidence indicates that shell and copper adornment objects entered the region during the thirteenth century, coinciding with the first appearance of palisade architecture, and the development of intentionally constructed ritual landscapes that served to create individual community identities, while at the same time drawing communities into a cross-regional political system.

Shepherd, Alison (VCP Augusta), Kelly Brown (VCP Augusta) and Josh Wackett (VCP Augusta)

[326] *Teaching Archaeology to Veterans: Case Studies from the Veterans Curation Program*
According to 36CFR79, collections recovered with federal funds must be made accessible to the public for research and educational purposes. However, this goal is deceptively difficult to achieve. Collections can be made available to professionals and archaeology students easily enough, but is there a way that we can involve the public in the process? The Veterans Curation Program (VCP), funded by the United States Army Corps of Engineers (USACE), St. Louis District, has become well known for doing just that; employing recently separated veterans as laboratory technicians to rehabilitate USACE owned or administered collections. USACE and VCP contractors have worked to close the gap between archaeologists and non-archaeologists by developing various reference guides, training exercises, and teaching collections. In this paper, we will highlight a few examples of the aforementioned training aids and examine how they have enabled the VCP’s veteran technicians to process archaeological and archival collections with accuracy and understanding.

Shepherd, Alison [326] see Janesko, Sarah

Sheptak, Rus (University of California—Berkeley)

[272] *Engaging Archaeology and Native American and Indigenous Studies*
Using concepts proposed and developed in Native American and Indigenous Studies would provide a useful way for archaeologists, especially those dealing with the relatively recent past, to address the challenge posed by indigenous scholars to decolonize archaeology. A few concepts have already been employed by archaeologists in North America, notably Gerald Vizenor’s idea of “survivance”. But as Maarten Jansen and Mixtec scholar Gabina Aurora Pérez Jiménez have shown in their work decolonizing Mesoamerican archaeology, there are even more ways to push forward. In this paper, I present a discussion of a series of concepts from Native American and Indigenous Studies that are being used by archaeologists working in the Americas, ranging from survivance to articulation to refusal to the indigenous archive, showing how the use of concepts developed under a decolonizing framework markedly shift the goals and interpretations of archaeologists.

[272] *Chair*

Sheridan, Kelton [176] see Pezzarossi, Guido

Sheridan, Thomas (University of Arizona) and Stewart B. Koyiyumtewa

[131] *The Way Forward: Native and Non-Native Collaboration as well as Multi-disciplinary Research Strategies*
As Native peoples assert their sovereignty over intellectual property as well as land and water, relationships between them and anthropologists are entering a new era characterized by collaboration as well as conflict. Ethical anthropologists in North America recognize that they need to secure tribal/First Nations permission for their research. Sometimes permission is granted only for projects of interest to the tribes themselves. And sometimes publication of that research for a wider audience may be restricted or denied. But the benefits of collaboration result in a much richer understanding of Native and non-Native relations, one informed and shaped by the perspectives of Native people themselves.
The Hopi Tribe of Arizona has been insisting on such collaboration for decades now. Nonetheless, some scholars working on the Hopi people continue to ignore such ethical guidelines and understandings. We argue that Southwestern archaeology, cultural anthropology, and ethnohistory will never progress beyond the limitations of Western epistemologies and lines of evidence biased by Western ethnocentrism and silences until collaboration is embraced and institutionalized as the only ethical and productive way to understand our shared pasts and presents. We discuss Moquis and Kastilam: The Hopi History Project as one example of such collaboration.

Sherwood, Sarah (Sewanee: The University of the South)

[180] *In the Morning House: The Redhorn Cycle Depicted in Rock Art from Kentucky*
This presentation reports on a new rock art site from Kentucky, brought to the authors’ attention by local citizens. Inside a large sandstone rockshelter, more than a dozen black pictographs show several anthropomorphic characters. These images bear distinctive features and regalia associated with the “Redhorn Cycle” hero narrative reported by Paul Radin in 1948 from his ethnographic work among the Ho-Chunk. The rock art from this “Morning

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House" strongly resembles well-known Mississippian period paintings from the Gottschall Shelter in Wisconsin and some of the paintings in Picture Cave, Missouri. The similarities include both subject matter and how the images are rendered. Morning House extends the geographic range of the Redhorn rock art corpus to the Eastern Woodlands, east of the Mississippi River.

[112] *Discussant*

Sheumaker, Christian [28] see Levi, Laura

Shi, Tao (Cotsen Institute of Archaeology, UCLA)

[140] *Resource, Transportation and the Political Landscape of the Chinese Bronze Age*

The political landscape of the Chinese Bronze Age was characterized by controlling the key resource situated in the distant regions from the Luoyang Basin. The study of key natural resources and their transportation networks should therefore be an important facet of research into state formation during the Chinese Bronze Age. The extraction and transportation of key resource, and its relationship with the cultural landscape addresses the basic political framework of the states in Early China. With the geoarchaeological survey into the turquoise and cinnabar mines in the Qinling Mountain Range, this paper explores the political landscape of the first Bronze-Age state, Erlitou, through analysis of geography, resource flow, transportation, and archaeological sites in the Qinling Mountain Range. Moreover, by integrating the materials from 3rd to 2nd Millennium BC in a broader geographical scale, this paper details the dynamic process leading from the prosperity of the fringe areas of the Loess Highland to the Luoyang-centric network. This transformation is not only reconfiguration of the political landscape, but also the preparation of knowledge prerequisite for the political landscape of the Chinese Bronze Age.

Shillito, Lisa-Marie (Newcastle University)

[126] *Feeding Stonehenge: The Potential of Coprolites as Tools for Reconstructing Diet*

The Feeding Stonehenge project combined zooarchaeology with pottery residue analysis to explore the diets and provisioning of the inhabitants of Neolithic Durrington Walls, the settlement associated with the construction of the iconic Stonehenge monument in southern Britain. A lack of preserved plant remains at the site, and an overwhelming dominance of porcine and ruminant lipids in the pottery, suggests that animal products were the major source of nutrition. This research tests this hypothesis through analysis of organic residues preserved in coprolites, which have not previously been incorporated into dietary studies. Can these more unusual forms of evidence provide additional information on non-animal inputs to diet at the settlement? Coprolites identified as human on the basis of sterol and bile acid profiles can be further analysed for dietary residues including plant microfossils.

[126] *Chair*

Shillito, Lisa-Marie [126] see Blong, John

Shimada, Izumi (Southern Illinois University), Carlos Elera (National Sicán Museum), Haagen Klaus (George Mason University), Alexandra Greenwald (Arizona State University) and Jenna Hurtubise (University of Alabama)

[65] *Large-Scale Human Sacrifice and Feasting at Sicán, Peru during the 11th-Century Mega-El Niño: A Multidisciplinary Vision*

We present a multidisciplinary summary vision of the natural and cultural contexts and impacts of an 11th century mega-El Niño event and the extraordinary social responses to and consequences of it. Evidence and impacts of torrential rains and associated severe flooding dated ca. 1050 CE have been documented at multiple sites along the Peruvian coast, particularly in the Lambayeque region. The flood buried the Middle Sicán capital of Sicán with fluvial deposits 1.0 to 1.5 m thick. During this calamitous process that may have lasted many months, three episodes of large-scale human sacrifice of well over 200 individuals who were overwhelmingly healthy young to adult males took place near the center of the Gran Plaza of Sicán. There are suggestions of possible live burials. Efforts aimed at the clarification of victim identities and life histories are ongoing, however, the abundance of serving vessels and food remains indicate correspondingly large-scale feasting events that were closely associated in time and space. Resultantly, we posit that these events may have been pleas for the return of normalcy. Within a span of one or two generations, the Middle Sicán polity underwent transformations, likely triggered by adverse effects of this mega-El Niño.

[141] *Discussant*

Shin, Dong Hoon [56] see Kim, Yong Jun

Shinde, Vasant [56] see Kim, Yong Jun

Shiner, Marion (University of Sheffield, UK) and Katie Hemer (University of Sheffield, UK)

[87] *Concern for the Living, Care for the Dead: Non-adult Burial at the Early Christian Cemetery of St Patrick's Chapel, Pembrokeshire*

Recent excavations below the ruins of a 13th–16th AD century chapel dedicated to St Patrick, at Whitesands Bay, Pembrokeshire in southwest Wales revealed ninety well-preserved burials dating to the 7th–11th century AD. There was an unusually high concentration of non-adults buried at the site, including a number of foetuses and infants. Some of these young individuals received elaborate burial forms, including the use of quartz-topped burials and cross-inscribed grave markers. It is necessary to consider why so much was invested in the burial of those whose lives were so short. This paper will therefore explore how the funerary rites accorded to these individuals reflect the concerns of the living regarding the well-being of society's youngest members in the afterlife.

Shiratori, Yuko (The Graduate Center, CUNY)

[252] *Commemorating the Preclassic Monumental Construction at Tayasal, Guatemala*

Research into the Main Group at Tayasal, Guatemala, revealed that the Postclassic inhabitants re-occupied areas and buildings that were constructed during the Preclassic period. Most of those buildings in the Main Group stand on a massive elevated platform, which was also constructed during the Preclassic period. The Preclassic period was the period during which the construction of monumental architecture such as E-groups and Triadic Group occurred at numerous sites including Tayasal. It was also the period during which ritualistic ideologies and collective identity were established and permeated. At Tayasal, the massive platform was elevated by a natural hill and held several platform groups. Two Triadic groups were constructed at the margin of the site, probably indicating the boundary of the community. The construction effort required for such monumental architecture may be a result of the emergence of a collective community identity and political authorities. In this paper we discuss Preclassic monumentality at Tayasal and how later occupants perceived and incorporated these constructions into their landscapes. Repeated occupation and remodeling of Preclassic architectures in the Postclassic period may mark the commemoration of ancestors.

[252] *Chair*

Shock, Myrtle [116] see Watling, Jennifer

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Shoji, Kazuho, Takayuki Omori and Vanessa La Rosa

[64] *The Change and Chronology of Preceramic Mound-Building Practices at the Cruz Verde Site in the Chicama Valley, Peru*
Excavations in 2016 and 2017 at the Cruz Verde site which is located in the coastal area of the Chicama Valley, revealed a stratified record of preceramic mound-building practices. These practices are constituted by various mortuary contexts and are particularly noted for their use of architectural reconstruction, an activity repeated from around 4000 cal. BC ~1900 cal. BC divided into two phases, the CV-1 phase and the CV-2 phase. We conducted a stratigraphic examination of these contexts, and carried out radio carbon dating to further analyze the processes of constructing mound and its change over time. These analyses revealed that accumulation of food waste midden and embedded mortuary contexts caused the growing of mound volume in the CV-1 phase, and the abrupt change to the beginning of architecture construction on the mound: an activity of constructing a room and the reconstructions of floors and walls which led to the division of inside space in the CV-2 phase. These processes indicate that the monumentality of mounds gradually increased in the CV-1 phase as the mortuary and food waste accumulating practice, and the increased monumentality caused the change of the utilization of this place around 2800 cal. BC, in the CV-2 phase.

Sholts, Sabrina

[143] *Ancient Biomolecules and Destructive Sampling at the National Museum of Natural History*

Biomolecular analyses have revolutionized the field of archaeology in the 21st century. Rapid advances in technology have lowered barriers to biomolecular information by increasing the speed, affordability, and effectiveness with which researchers can extract and analyze biomolecules from ancient materials. Amid growing attention on museum collections as a source of samples for biomolecular research, the people who curate and manage these collections are faced with new challenges and considerations. Although destructive sampling is often necessary for the best available techniques, critical questions remain about how to balance the gain of scientific knowledge against the loss of materials for future study.

This paper addresses major issues in biomolecular research and destructive sampling within the context of the physical anthropology collections at the National Museum of Natural History (NMNH) of the Smithsonian Institution. External and internal processes for destructive sampling requests are reviewed, and appropriate conditions and expectations for approved proposals are discussed. Ultimately this paper aims to facilitate ethical and excellent biomolecular research on archaeological remains at NMNH, which has a responsibility to preserve and provide access to its collections in the service of science and for the public, as well as an institutional mandate to increase and diffuse knowledge.

[143] *Chair*

Sholts, Sabrina [143] see Carreon, Samuel

Shott, Michael (University of Akron) and Erik R. Otárola-Castillo (Purdue University)

[103] *Parts of a Whole: Reduction Allometry and Modularity in Experimental Folsom Points*

Points were designed for use but also for repair or rejuvenation. Points accumulated in the archaeological record at stages from first use to extensively resharpened. Thus, specimens of a single type could enter the record in a range of sizes and shapes. Resharpening allometry has been documented in many studies, including geometric-morphometric (GM) ones. One hypothesis is that flintknappers designed points as separate "modules" to accommodate their overall function. This hypothesis views the base and blade portion of points as two modules of whole units, designed to perform different tasks and thus treated differently during the design and resharpening process. Using geomorph and the recently developed zooRchGUI that exploits the functionality of R through a graphical user interface, we conducted 3D GM analyses of a set of experimental Folsom points as they passed through successive stages of use, damage, and repair. We report degree of allometric variation in both base and blade as a function in part of number of resharpening episodes, and changing patterns of integration within separate base and blade modules. Results are a step toward calibrating point size and shape to number or degree of resharpening episodes.

Shpall, Cahill (University of Oregon Anthropology Department), Katelyn McDonough (Graduate Student Texas A&M) and Dennis Jenkins (University of Oregon, Department of Anthropology)

[47] *Elko Chronology: Connelly Caves Lithic Analysis and Great Basin Implications*

Consistent Elko chronology in the Northern Great Basin remains elusive to the archeological community. Numerous symptoms can be determined to be the cause of this absence of information, including a lack of in depth analysis in the region, extensive sediment disturbance leading to non-conclusive stratigraphic dating where studies have taken place, and a shortage of differential site comparisons. Connelly Caves provides an amazing opportunity to combat this archeological affliction through the analysis of the convergence of Elko era lithic technologies. Paired with extensive literature analysis, site comparisons and detailed chronological construction, further insight into Elko lithic technologies and implications can be achieved. The completion of this poster will result in a detailed explanation of Elko Lithic technology, including physical identification, construction, use, and chronology. Implications of the importance of using lithic technologies within the archeological record to track cultural transmission and evolution will be discussed, along with the results of in depth analysis of the Elko presence at Connelly Caves. Further extrapolation of the caves geographic importance and history will be addressed and the placement of the lithic chronology into the larger world-view of the Elko Archeological record will bring this undertaking to completion.

Shrestha, Ramesh [299] see Fernandez Diaz, Juan

Shreve, Nathan [241] see Ermenwein, Eileen

Shunkov, Mikhael [41] see Douka, Katerina

Shuttleworth, Andrew (Queen's University Belfast)

[329] *Paleoanthropology and Pedagogy: Raising Horizons for the Next Generations*

The 21st century will be remembered as a period of exponential change within paleoanthropology. Though such developments pose academic challenges, an overlooked issue is how we communicate this information to students. A constantly changing foundation of knowledge that increasingly requires an understanding of complex theoretical techniques, coupled with the importance of student satisfaction surveys, educators are faced with a pedagogical dilemma: stick with 'established' teaching methods though they are increasingly recognised as being ineffective and may even alienate students from their passion of human origins, or invest more of what little time we have in developing new, innovative ways of teaching even if that increases the risk of failure. This paper presents two pedagogical exercises, developed over four years of undergraduate teaching, that 'open up' theoretical concepts in paleoanthropology by removing paleoanthropology entirely. Utilising a pop cultural staple in the form of Star Trek which addresses issues of speciation and diversity relevant to paleoanthropology, these exercises offer an innovative, fun, and informative way for students to learn, understand, and apply the theoretical underpinnings of species recognition and phylogeny; that once understood can be applied to the fossil record with a greater understanding and confidence than more traditional methods currently provide.

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Sichler, Judith (Pellissippi State CC)**[90]** *Provisioned and Caught: Historic Perspectives on Diet in the Danish West Indies*

Historic records indicate that during the late 18th and into the 19th century preserved North Atlantic fishes were shipped to the West Indies as a relatively cheap source of protein to feed enslaved persons and also the planter class. However, in historic zooarchaeological analyses of faunal assemblages from the Caribbean, the presence of these food remains is often not identified. Using two sites from the Danish West Indies, a case will be made for the use of fine-screen techniques to ensure adequate recovery of these remains to provide a more complete dietary picture and definitive evidence of provisioning. Additional faunal data show a predominance of marine fish and mollusk remains and limited use of domestic species.

Sidéra, Isabelle [89] see Martisius, Naomi L.

Sieg, Lauren (National Museum of the American Indian)**[322]** *Moderator*

Sierpe, Victor [155] see San Román, Manuel J.

Sievert, April (Indiana University)**[60]** *Moderator*

Sigurðardóttir, Ragnhildur [167] see Hicks, Megan

Sillar, Bill (Institute of Archaeology, UCL)**[207]** *Canas, Canchis and Cuzco: What Was the Scale of Community Allegiance in the LIP?*

The Inca encountered the Canas and Canchis ethnic groups when they expanded out of Cuzco. Canas sites in the herding areas of Espinar show larger scale and more developed settlements than most of those in their agricultural region of the upper Vilcanota Valley. This raises questions about the scale of 'community' (village, kinship group, subsistence group, ethnic group). But to address this we need to consider the degree to which allegiance to leaders, ancestors and huacas as well as the seasonal exchange of commodities and labour can integrate spatially separated groups. It is suggested that some aspects of 'LIP' social organisation began to develop in the final stages of Middle Horizon and were widely shared across the Andean highlands. Finally, the developments of social organisation by the Canas and Canchis in the LIP will be compared with contemporary developments in the Cuzco region.

Silliman, Stephen (University of Massachusetts Boston)**[272]** *Beyond the Holes of Archaeology: Paying Attention to Indigenous Academics, Artists, and Activists*

Archaeology continues to need the infusion of indigenous perspectives, not only to take responsibility for the discipline's past in colonial contexts, but also to advance its ability to understand human histories—especially indigenous ones—in respectful, innovative, and inclusive ways. This need is particularly strong for those archaeologists who study Native American cultural and community life just before, right into, and well after the onset of European colonialism and for those who are paying attention to the broader context in which archaeology operates (or doesn't) today as a direct result of those colonial issues. To do so, we often have to get out of our archaeological "holes" to engage with other scholarship and artistic interventions. This paper highlights some Indigenous academics, artists, and activists whose works have influenced me—showing me broadened ways to think about the past, better ways to use archaeology, and deeper contextualizations of the issues well beyond our disciplinary confines.

Silva, Rosicler (Pontifícia Universidade Católica de Goiás), Julio Cezar Rubin de Rubin (Pontifícia Universidade Católica de Goiás), Maira Barbari (Pontifícia Universidade Católica de Goiás) and Sibeli Viana (Pontifícia Universidade Católica de Goiás)**[2]** *New Perspectives in the Geoarchaeological Context of Hunter-Gatherer Sites from the Beginning of the Holocene, Serranópolis, Brazil*

The GO-JA-01 and GO-JA-02 archaeological sites, located in sand stone shelters of Serranópolis excavated from the 1970s to 1990s and earliest at 10,400 years B. P., were occupied by hunter-gatherer and agricultural-ceramic groups. Recent studies have raised hypotheses regarding the appropriation and construction of the landscape by hunter-gatherer groups, based on evidences related to the paleoenvironment and the archeological site formation process in the Rio Verde river alluvial plain. The purpose of this study is to present some of the variables used in approaching the geoarchaeological context, broadening discussions regarding the occupation of the area.

Silver, Josh [251] see Troccoli, Ruth

Silverman, Shari (Washington State Parks & Recreation)**[84]** *Geoarchaeology of Lwalb Old Channel One (45KI815), South Park, Seattle, Washington*

Lwalb Old Channel One, a shell midden, spans both sides of an oxbow within the historic Duwamish River floodplain. The oxbow is buried under the streets of the South Park neighborhood, Seattle, Washington. Also called 45KI815, the site's shell component is light. Therefore, the midden does not mask contemporaneous geomorphological features of the oxbow and surrounding wetland. Visible soil features include the channel; vegetation effects on soil movement; midden migration; possible liquefaction scars; and even old shovel marks, potentially from shellfish harvest. The Duwamish River itself has undergone massive geographical changes. Natural forces governed these changes initially. During the turn of the twentieth century, however, humans significantly altered the landscape. Lwalb Old Channel One's geoarchaeology opens a window into this transition.

Silverstein, Jay (Univ of Hawaii/DPAA) and Hamedy Mashaly (Supreme Council of Antiquities, Egypt)**[32]** *Sacred and Profane Aspects of Water Management in Ancient Thmuis, Egypt*

Water management in ancient Egypt entailed harnessing natural and supernatural forces. Thmuis grew to power in the heart of the Nile Delta evolving as a nexus of Greco-Egyptian ideological syncretism within a riverine/lacustrine environment. Water management challenges included mitigating damage from annual floods, optimizing production, and maintaining transport. To survive in this dynamic hydrologic regimen, the people of Thmuis harnessed and controlled the Nile waters through engineering and spiritual intervention. Over the last several seasons of archaeological study at Tell Timai, evidence of the religious and profane hydraulic infrastructure have been unearthed. A nilometer, well-constructed paved channels, large and small wells, lesser drains, and evidence of floods attest to the effort and investment made in water management. These discoveries help shape our understanding of the relationship between Greco-Roman Thmuis and the lacustrine delta fill environment where it thrived.

Simek, Jan and Alan Cressler**[90]** *Sacred Animal Images in Precontact Southeastern Rock Art*

Walter Klippel has always focused his research on animal remains from archaeological sites, especially from Southeast North America. In honor of his retirement, we review how animals are depicted in Precontact rock art sites from the region he knew so well. A wide variety of creatures—mammals, birds, reptiles, fish, and even insects—were illustrated by ancient southeastern artists. Animal imagery appears in both open air and cave art, although

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the kinds of animals vary between these two contexts. The animals used most intensively for food, however, were less commonly drawn on rock and cave walls. Animals that were depicted most often were those who could cross between land and water, from the air to the ground, or from the surface to subterranean worlds. We argue for a spiritual aspect to rock art animal images.

Simek, Jan [180] see Sherwood, Sarah

Simeonoff, Sarah, Curtis W. Marean (Institute of Human Origins, School of Human Evolut) and Jamie Hodgkins (Assistant Professor Department of Anthropology Uni)

[99] *Zooarchaeological Analysis of a Late Pleistocene Interglacial-Glacial Transition at Pinnacle Point Site 5–6, South Africa*

Understanding if and to what extent early anatomically modern humans adapted to dramatic climatic events is essential to human origins research. Pinnacle Point—a complex of cave sites and rockshelters along the southern coast of South Africa—offers a unique opportunity to study human adaptability through time. The long sequence at Pinnacle Point Site 5–6 (PP5–6) spans 164–44 thousand years ago and encompasses two Interglacial to Glacial Marine Isotope Stage transitions (Stages 5–4–3). This study analyzes faunal remains dated to the MIS 5–4 transition occurring early in the sequence at PP5–6. The change in climate during this transition caused the Paleolithic coast to retreat, possibly necessitating a change in resource procurement strategies by humans occupying the cave. The extent and nature of this change is examined through surface modifications (i.e., cut marks, percussion marks and notches), extent and location of burned remains, and the species composition of fauna transported to the site. Preliminary results suggest that the frequency of surface modification and burning increased during the transition. This zooarchaeological analysis will add to research on the adaptability of early humans to environmental shifts at Pinnacle Point.

Simmons, Alan (University of Nevada Las Vegas, Department of Anth)

[41] *Aquatic Neanderthals and Paleolithic Seafaring: Myth or Reality? Examples from the Mediterranean*

It long has been assumed that most of the world's islands, especially remote ones, were first visited or colonized by fully modern humans. With few exceptions, these events occurred late, during the Neolithic or later, with an implied assumption that most islands could not support hunters and gatherers. We know that this scenario is no longer viable, with examples from Australia and southeastern Asia, such as Flores and Sulawesi, suggesting considerable antiquity extending prior to the emergence of both modern *Homo sapiens* and Neolithic economies. In this presentation, I summarize some of the emerging data from the Mediterranean that suggests pre-Neolithic, and in some cases, pre-modern, seafaring to some of the islands. Also addressed are the substantial problems of documenting and dating such sites. Finally, I conclude with the implications of systematic seafaring in human evolution, especially as it relates to the considerable skills required for seafaring, such as long-term planning, adequate technology, navigation abilities, and, ultimately, "why" such activities would even be undertaken in the first place. If pre-modern seafaring can be adequately documented, and shown to be systematic rather than random or one-time events, it indicates that these early humans had cognitive skills similar to fully modern people.

Simmons, Scott (University of North Carolina Wilmington)

[302] *The Integration of Island and Mainland Maya Communities: Perspectives from Ambergris Caye, Belize*

After a span of over twenty years archaeological investigations have resumed at the San Pedro site, located in downtown San Pedro, Ambergris Caye. Investigations in the early 1990s revealed portions of a Spanish contact period Maya community that was settled as early as the 14th Century CE. Based on previous as well as ongoing investigations at the San Pedro site and other Maya sites on the island and the mainland, it appears that communities on the caye were linked to one another in various ways. Likewise, communities on the island shared certain characteristics with those on the mainland of northern Belize, most notably in the areas of material culture and mortuary behavior. Here the results of investigations in previously untested areas at the San Pedro site are summarized, and the evidence for Maya cultural adaptations to changing environmental and social conditions on Belize's coast is highlighted. Research conducted on Ambergris Caye also draws attention to the similarities the San Pedro site and other sites on the island share with those on the mainland of northern Belize, as well as the unique characteristics of the island sites, particularly with regard to their architecture and settlement characteristics.

Simon, Arleyn

[152] *Discussant*

Simon, Arleyn [91] see Wright, Aaron

Simon, Katie

[286] *Illuminating Haiti's Royal Past: Advancing Analytics through 3D Data Fusion of Terrestrial Surface Models and Subsurface Geophysical Data*
Since 2015, the Milot Archaeological Project has conducted a series of archaeological explorations at the Royal Palace of Henry Christophe in the town of Milot in Northern Haiti. This site, called Sans-Souci, was a principal site of political authority in the short-lived Kingdom of Haiti (1811–1820) and is a UNESCO World Heritage site of paramount importance to national development strategies in Haiti. Working with the Institut National d'Éthnologie (Haiti), the Bureau National d'Éthnologie (Haiti), the Center for Advanced Spatial Technologies (University of Arkansas), and the Center for Digital Archaeology (CoDA), the Milot Archaeological Project sought a research strategy centered on minimally invasive excavation, maximal data recovery, and rapid reporting. This paper outlines the results of ground penetrating radar and terrestrial laser scan surveys conducted by CAST and explores the utility of combining these 3D datasets to investigate research questions regarding construction phases that would otherwise be difficult, if not impossible, to address using traditional methods. This effort aims to elucidate the analytical potential of employing advanced 3D data fusion and visualization methods beyond mere documentation.

[286] *Chair*

Simon, Rebecca and Shanna R. Diederichs (Crow Canyon Archaeological Center)

[226] *"Where the Stone Wall Ends": Exploring Community Development through Great House Architecture*

Crow Canyon Archaeological Center's latest project, the Northern Chaco Outliers Project (NCOP), continues the tradition of research around the theme of community. The Lakeview group is one of the densest concentrations of great houses in the central Mesa Verde region of southwest Colorado. The group includes three sites, the Haynie site (5MT1905), the Ida Jean site (5MT4126) and Wallace Ruin (5MT6970). The NCOP focuses on community development, social stratification, and identity formation at the Lakeview group during the Chaco to post-Chaco transition (A.D. 1000–1280). Using a combination of archival data, architectural documentation, and spatial analysis, this study demonstrates the deep history of the Lakeview group and begins to explore the economic, social, and symbolic bonds between the great houses within the community and to the greater Chaco regional system.

[289] *Discussant*

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Simova, Borislava (Tulane University)**[129]** *Negotiations in the Ritual and Social Landscape of Actuncan, Belize*

Our understanding of the ancient Maya is informed to a great extent by the material remains of ritual performance in both domestic and public contexts. Maya populations throughout Mesoamerica were united by a shared cosmology patterning the timing, location, and material aspects of ritual performance. Yet, ritual was not a static or rigid construct, dutifully replicated across populations. At the site of Actuncan, Belize, we find that aspects of domestic ritual cycles,—including form, content, placement, and frequency,—show a flexible, even creative approach to ritual. In each foundation, renovation, and termination of a house, the inhabitants had the opportunity to carry out rites before groups of varying sizes, conveying a sense of community in some and distinction in others. These performances, and their material remains, were key components in the literal and figurative construction of the Actuncan community, as commoner and elite households actively reworked architectural forms and ritual templates to either perpetuate existing identities or signal new trajectories. This paper examines household ritual deposits associated with construction events as resources used to different ends by elites and commoners to negotiate interactions between existing physical structures on the landscape and sociopolitical structures in the Actuncan community.

Simova, Borislava [129] see Fulton, Kara A.

Simpson, Ian [34] see Madsen, Christian K.

Simpson, Nick (Colorado State University) and Christopher T. Fisher (Graduate Advisor)**[31]** *Using LiDAR to Map an Ancient Purépecha Water Management System in ArcGIS*

Recent applications of LiDAR technology at the Late Postclassic city of Angamuco, located in the heartland of the ancient Purépecha Empire in modern day Michoacan, Mexico are allowing for the identification and analysis of urban features in innovative ways. A complex system of constructed water management features consisting of reservoirs, sunken plazas, and connective canals were a vital form of infrastructure that were required for the movement of water across the dynamic landscape upon which the city is located. Access to water played a crucial role for the occupants of Angamuco in everyday life, and for the maintenance of inner-city gardens located throughout the city. Using various tools in ArcGIS to render different visualizations and employing mapping contours at various scales, my aim is to identify and measure the natural depressions and constructed features that compose the water control system across the site. The primary goal of this research is to better understand the hydrological makeup of the city and surrounding landscape as well as to better understand the ways the inhabitants of Angamuco organized themselves to optimize access to water throughout the year.

Sims, Marsha**[180]** *A Mesoamerican Culture Hero Legend in Western U.S. Rock Art*

Research ties Mesoamerican search for ancestors to U.S. rock art. A hero in Mexican Aztec legend fought his sister, Coyolxauhqui, and the titans, decapitating her, rolling her body down the mountain, and leaving her head on the mountain. Coyolxauhqui is a floating head on Mesoamerican murals, decapitated and dismembered on the Coyolxauhqui stone. She was the moon, queen, and an avatar of their Earth Mother. She is commemorated in Basketmaker and later rock art in Colorado and Utah at 5 Faces and 4 Faces pictographs in Davis and Salt Creek canyons, and in Bullet Canyon, Little Rainbow Park, and Cub Creek. The Earth Mother is represented as unclean, covered with snakes in Mesoamerican iconography. In North America she is rendered in charcoal at Bullet Canyon, Hog Springs, Black Dragon Canyon, San Rafael Swell, Horseshoe Canyon, and presented in this research is a newly recorded pictograph in a deep crevice along the eastern Front Range. The hero, as the hummingbird, is in Tsankawi and Long House ruins, Black Canyon, La Cieneguilla, San Crisóbal, and Galisteo. Titans, as proboscideans, are at Bullard Cove, Shay Canyon, Colorado River gorge, and Indian Creek Canyon.

Sinclair, Jacinda (Memorial University of Newfoundland)**[36]** *The Complexity of Archaeological Site Revisits: A Case Study from Labrador*

The five sites recorded in Junius Bird's 1934 survey of the Hopedale area are both culturally important to the local Inuit community and to the history of the creation of archaeological narratives about the Labrador Inuit. Recently, the Hopedale and Nunatsiavut governments have stated a desire for additional archaeological research prompting Memorial University to revisit the Avertok and Karmakulluk sites to conduct additional excavations. In the 83 years that have passed since Bird's work, many transformations have occurred within archaeological theory and methodology and this time period has also seen many transformations within the town of Hopedale and its community. The effects of these transformations on the current research are complex, presenting both advantages and disadvantages and impacting both the data obtained and how it is interpreted and utilized.

Singer, Zachary (University of Connecticut), Peter Leach (University of Connecticut; Geophysical Survey Syst), Tiziana Matarazzo (University of Connecticut), Cosimo Sgarlata (Western Connecticut State University) and Dawn Beamer (University of Connecticut)**[294]** *Beyond a Stone's Throw from the Lithic Source: New Investigations of the Paleoindian Component at the Templeton Site in Western Connecticut*

2017 marks the 40th anniversary of Roger Moeller's initial excavation of Templeton, the first Paleoindian site systematically studied in Connecticut. New excavations at Templeton were conducted in 2016 and 2017 to further document the Paleoindian component of the site. This presentation reports on the results of the new excavations and the reanalysis of the Paleoindian materials recovered Moeller.

Singh, Ravindra [121] see Petrie, Cameron

Singleton, Hayley (Amherst College)**[149]** *Discussant*

Sion, Julien [80] see Hiquet, Julien

Siqueros, Bernard [331] see Hill, Brett

Sise, Samantha [241] see Anderson, C. Broughton

Sistiaga, Ainara (Massachusetts Institute of Technology), Sepideh Parkour (Broad Institute), Mathilde Poyet (Massachusetts Institute of Technology) and Roger Summons (Massachusetts Institute of Technology)**[126]** *Variation in 5βstanols Excretion in Humans and Its Implications for the Application of Fecal Biomarkers in Archaeology*

Fecal biomarkers have proven to be a valuable tool to identify the likely source of fecal matter and have successfully been applied in archaeology. They provide direct evidence of the digestive physiology and diet of the source, and critical data to assess the origin of fecal deposits. 5βstanols can be used as fecal biomarkers because they uniquely form in the gut of higher mammals during metabolic reduction of sterols. However, the actors of this

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microbial conversion still have to be elucidated and only a few cholesterol-reducing strains have been isolated (only one from human feces). Genes or enzymes involved in this metabolism are still unknown.

Here we present GC-MS and genomic data from fecal samples collected from healthy individuals with different diets and lifestyles. Our results show high diversity in lipid content which can be related to inter-variation of gut microbiome. Almost half of our donors showed little or no conversion, presenting elevated levels of cholestadiene. Our study shows the complexity of 5 β stanols production in the human gut and its application to archaeology. Further investigation into the microbial actors of this conversion could open a new window into the study of ancient microbiomes and their role in human evolution.

Sittig, Peter [184] see Cassedy, Daniel

Siveroni, Viviana (Institute of Archaeology, University College London)

[132] *The Incas in Nasca: A Review of Data from the Northern Drainage*

Little research has been conducted in the Nasca region to explicitly improve our understanding of the nature of Inca occupation in the region. A while back, Menzel (1959) noted the lack of local monumental architecture associated to Inca sites in Nasca. In contrast to the Ica valley, surface data from sites in the Nasca area suggest that local populations lacked socio-political complexity and were organized at the level of simple chiefdom structures. Later on Schreiber (1992) suggested that the integration of the territory was achieved by adding an administrative tier to the local settlement pattern. However, there is no known local settlements which are spatially associated to Inca buildings. Schreiber suggests the Incas' interest in Nasca was due to its strategic location at the junction of the highland with the coastal Inca road. In this paper, I use data from excavations at Huayuri in the Santa Cruz Valley in the Nasca drainage to explore the nature of interactions between local households and the Inca state. I will focus on the analysis of ceramic material to delineate possible cultural and economic interactions. Also, I will draw on surface data from three other sites to further understand this relationship.

Skaggs, Sheldon (Bronx Community College CUNY)

[256] *Caches, Burials, and Vases, Oh My: Ritual Deposits in an Elite Courtyard at the Ancient Maya Site of Pacbitun, Belize*

Recent investigations in a large, enclosed courtyard on the southwest corner of the ancient Maya site of Pacbitun, Belize, revealed evidence of successive emplacements of ritually important deposits. Initial analysis of the ceramic material suggests that the entire courtyard plaza has only one or two floors, with construction and use only during the Late to Terminal Classic period (600—900 CE). Five caches and two cyst graves were related directly to the plaza floor. The caches consisted primarily of ceramics, but some also included jade and obsidian eccentrics. The two cyst graves were on the western and eastern edges of the central excavation unit. Additional graves, with slate capstones, were found west of the central unit. Either these were initially intrusive through the plaza floor, or subsequent revisiting of the burials breached the plaza floor. A burial on top of the westernmost slate capstones was particularly interesting, with associated fragments of a partially restorable Uluva Valley marble vase, a pair of carved shell atlatl finger loops, jade inlaid teeth, and shell and bone grave goods. The burials, caches, and associated artifacts are compared with other Belize Valley and lowlands sites, illuminating relationships between ritual practices across these areas.

[256] *Chair*

Skaggs, Sheldon [256] see Powis, Terry

Skeates, Robin, Jessica Beckett and Cezary Namirski (Durham University, UK)

[136] *Ritual Performances in and around Caves in Bronze Age Sardinia*

This paper understands performance as an embodied, site-specific and temporary event. It consequently emphasizes the diversity of ritual performances identifiable archaeologically, not only in the context of different types of cave and rock-shelter, but also between these and other types of site in the landscape. In doing so, the paper evaluates the liminality of these places and ritual performances, which were—to varying degrees—separated spatially, temporally and symbolically from the rest of life. It also considers the extent to which traditional practices were transformed over the course of successive performances. Mortuary rituals in Bronze Age Sardinia are used as a case-study. Mortuary practices (and especially the treatment of human remains) identified at cave sites, megalithic tombs and rock-cut tombs are compared. Particular attention is focussed on a group of Bronze Age burial caves and rock-shelters excavated and studied recently by the authors in the territory of Seulo in central Sardinia.

Skeens, Jeremy (University of Iowa)

[26] *Sifting through the Sherds: An In-Depth Look at the Ceramic Assemblage from Woodpecker Cave (13JH202)*

Woodpecker Cave (13JH202) provides a unique opportunity to study variation in ceramic technology and resource allocation during the ceramic production process at a Late Woodland East-Central Iowa site. Excavations by the University of Iowa field school spanning six seasons have recovered hundreds of ceramic pottery sherds from Woodpecker Cave, including a modest amount of decorated rim pieces and a large number of undecorated body sherds. Previous typological analyses of the ceramic assemblage have supported the hypothesis that the site was host to repeated seasonal occupations spanning hundreds of years. In this study, both quantitative analysis of ceramic thin sections and elemental analysis of sherds utilizing portable x-ray fluorescence (pXRF) were implemented to identify variations in local clay sources, paste characteristics, and potential tempering agents within vessels at the site, as well as local and regional patterns. Additional residue analysis helped to define temporal aspects of the site and allowed for broader comparative analyses involving similar regional research, which can aid in further studies regarding social behavior in the prehistoric Midwest.

Skillern, Megan [243] see Hankins, Sharon

Skinner, Dougless, Paul Williams Sr. (Gwich'in Elder), Holly McKinney (University of Alaska Fairbanks) and Michael Koskey (University of Alaska Fairbanks)

[250] *White Eye Traditional Knowledge Camp: Exploring Prehistoric Subsistence Behavior through Gwich'in Traditional Ways of Knowing*

This study explores how indigenous archaeological methods can quantitatively assess prehistoric subsistence practices in interior Alaska. Archaeological sites in Alaska are among the oldest in the Americas, providing valuable information concerning human/animal interactions. Although there are substantial amounts of archaeological information present in the literature, there is a distinct lack of indigenous ecological knowledge. The goal of this project is to combine traditional indigenous ways of knowing with archaeological methods to make inferences about past human behaviors. The traditional knowledge camp, conducted during the summer of 2017 along the banks of the Yukon River, was a collaboration between elder Paul Williams Sr. and the University of Alaska Fairbanks. It was created for elders to teach Gwich'in ways of knowing to community members and students in a traditional fish camp setting. This research utilized that learning space to explore the effects of traditional capture, processing, and cooking activities on fauna in a way which appropriately represented traditional elder knowledge. Isotopic analysis was then used to quantitatively associate the modern subsistence activities to prehistoric behavior. The research to be presented will discuss how the traditional knowledge and the isotopic analysis of this project informed about past human behaviors in the Arctic.

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Skinner, Jessica

[306] *Three-Dimensional Musculoskeletal Modeling in Commingled Analysis: A Preliminary Study at the Milwaukee County Poor Farm Cemetery*
The analysis and disentanglement of human skeletal elements from commingled burial contexts is an essential step in creating individual identifications. This commingled analysis often includes a reliance on joint articulations to determine holistic element reassociations. Manual methods currently exist to test joint articulations for potential reassociation, but most appendicular joint articulations fall within the low reliability category for this method (Adams and Byrd 2014). Many cases of commingling at the Milwaukee County Poor Farm Cemetery may benefit from joint articulation designations of these low reliability categories. In an effort to provide additional lines of evidence to support these reassociations, this study investigates the efficacy of a three-dimensional joint articulation simulation technique, using a NextEngine scanner and open source software to test joint articulation designations.

Skov, Eric [332] see Giles, Bretton

Skowronek, Russell (University of Texas Rio Grande Valley), Brandi Reger (University of Texas Rio Grande Valley), James Hinthorne (University of Texas Rio Grande Valley) and Juan Gonzalez (University of Texas Rio Grande Valley)

[89] *pXRF Identification of Prehistoric Lithic Artifact Material, Resource Clusters along the Lower Rio Grande*
The U.S.-Mexico border region along the Rio Grande River, separating the southernmost Texas counties (Cameron, Hidalgo, Starr and Zapata) from the Mexican state of Tamaulipas, is a strategic corridor for prehistoric human travel connecting the Gulf of Mexico with the interior of the continent. The area contains a history of human presence extending over 11,000 years, evidenced by a wealth of projectile points that have attracted collectors for decades. To understand prehistoric people's choices of raw materials for making artifacts, we have partnered with local museums and local private collectors to construct a geochemical data set, currently at ~1,000 entries, from modified and unmodified local lithic materials, using portable x-ray fluorescence to measure ratios of selected elements in each sample. We then use cluster analysis to differentiate populations of rock types, notably the wide range of chert types and volcanic rocks found in local rock and gravel units. Unique among the rock types so far identified is the El Sauz chert, with high contents of zirconium and titanium and known restricted outcrops in south Texas.

Slater, Donald (Phillips Academy, Robert S. Peabody Museum, & Brandeis University) and Ryan Collins (Brandeis University)

[134] *Just for the Celt of It: Investigations and Discoveries beneath the Petroglyph Panels of Aktun Kuruxtun, Yucatan*
During 2011 excavations deep beneath the petroglyph panels in Aktun Kuruxtun, Mexico, members of the Central Yucatan Archaeological Cave Project (CYAC) uncovered a small tunnel leading into a previously unknown chamber of the cavern. The discovery came in the final days of the field season, however, and the chamber was too choked with flood sediments to be methodologically investigated. As a result, the passage was reburied. Last summer, CYAC returned to the cave and successfully explored the tunnel and the small chamber to which it led. In the process, the team discovered an altar just outside of the tunnel, and also unearthed a cache of two ceremonial greenstone celts at the threshold of the interior chamber. These finds, and associated organic material, have allowed for a more nuanced interpretation of the ancient usage and chronology of the Petroglyph Chamber in Aktun Kuruxtun. Further, the raw material used in the production of the celts, and their axial positioning within the cave, situates the deposit within wider cultural contexts in Central Yucatan and more broadly across the Maya region.

Slaughter, Mark (Bureau of Reclamation) and Lauren E. Jelinek (Bureau of Reclamation)

[72] *Lessons Learned through Tribal Consultation*
The federal government examines, funds, and constructs a wide variety of projects ranging in size from very small to those that cover multiple states. At any given time both the federal and tribal governments are working on multiple projects of different scales simultaneously. This can create challenges when engaging in consultation, both in the establishment of the appropriate level of consultation and in and the maintenance of those relationships. Establishing productive collaborative relationships between tribal governments and the federal government can be exacting, especially when discussing projects that could modify the landscape. We have found that by meeting "early and often" with tribal officials, we learn from each other and develop a more effective consultation environment. In this paper we discuss our experience consulting with tribal governments to identify sacred sites and traditional cultural properties, and working together to ensure those resources are given the attention and protection they require.

[289] *Discussant*

Slaughter, Michelle [39] see Larkin, Karin

Šljivar, Duško [77] see Mlyniec, Michael

Sload, Rebecca

[134] *Means, Motive, and Opportunity: Use of the Sun Pyramid Cave at Teotihuacan Post Termination*
Ceramics and radiocarbon dates indicate that Teotihuacanos ceased using the cave beneath the Sun Pyramid around the middle of the third century CE, at a time when the city was only just entering its "Classic" period florescence. A reverential termination seems quite likely. Evidence also indicates that post termination use of the cave occurred. As there were approximately 1700 years in between cessation of initial use and modern discovery of the cave in 1974, this paper explores the question of when reentry could have occurred. What evidence constrains the time frame? Could Teotihuacanos have reentered? As suggested by ethno-historical sources, could Aztecs have used the cave? I consider means, motive, and opportunity.

Sloum, Diane (Northern Arizona University) and Jaime Awe (Northern Arizona University)

[30] *Contextualizing Xunantunich in the Late Classic Belize Valley through Investigations of Structure A9*
Xunantunich, an ancient Maya site in the Belize Valley, rose rapidly from a minor political center to a powerful regional polity during the Late Classic period (AD 600–900). Previous researchers suggested that this rapid rise was influenced by Xunantunich's relationship with the more powerful polity of Naranjo in the nearby Petén Province of Guatemala. Their argument was based in part on a Late Classic period building program at Xunantunich resulting in a site layout that resembles that of sites in the eastern Petén. Through our investigations of Structure A9, a temple pyramid in the site's civic-ceremonial epicenter, we examine the local and regional socio-political significance of the site, and test the hypothesized influence of Naranjo on Xunantunich's dramatic Late Classic period apogee.

Slotten, Chelsi [14] see Wesp, Julie

Slotten, Venicia (University of California, Berkeley) and David Lentz (University of Cincinnati)

[254] *The Social Dynamics of Ceren's Household Gardens*
The Late Classic Maya village of Joya de Ceren's extraordinary preservation by the Loma Caldera eruption allows for a unique opportunity to not only understand what plant species the ancient inhabitants utilized in their daily lives but also how the cultivation of these plants shaped the social and economic environment. While Ceren has spectacular preservation of extensive outfields of maize, manioc, and numerous weedy species, this paper will focus on the cultivated spaces surrounding the various structures uncovered at the site. Various fruit trees, annual and root crops, fibrous and other

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useful plants were chosen to be cultivated within the village center. The assorted array of economically useful species reveals the diversification of foodstuffs readily accessible to the inhabitants on a daily basis that weren't just the annual crops planted within the outfields. The gardens further created a distinction between village members and households with various roles and positions implied by what flora each household prioritized as their preferred nearby resources. Additionally, the gardens show the incorporation of plant-derived materials into the political economy of the region. The long history of paleoethnobotanical research at the site allows for a deeper study of the social meanings behind Mesoamerican kitchen gardens.

Slovak, Nicole (Santa Rosa Junior College) and John Rick (Stanford University)

[66] *Who's Who? Investigating Historic Burials at Chavín de Huantar Peru Using Radiogenic Strontium Isotope ($87\text{Sr}/86\text{Sr}$) Analysis*
 Since 2009, the Programa Arqueológico Chavín has unearthed a series of historic burials from the Monumento Arqueológico Chavín de Huántar. Although the identity of the deceased remains a mystery, initial archaeological and ethnographic evidence suggests that the individuals may be casualties of the War of the Pacific (1879–1883), perhaps even Chilean soldiers who met an unusual and unfortunate fate at the hands of Chavín's residents. The current paper presents radiogenic strontium isotope ($87\text{Sr}/86\text{Sr}$) data from tooth enamel from 10 of these skeletons in order to evaluate the above hypothesis. Results demonstrate that nearly all of the individuals exhibit $87\text{Sr}/86\text{Sr}$ values that fall within Chavín's bioavailable range, suggesting that they were either born locally or hailed from a region with a $87\text{Sr}/86\text{Sr}$ signature similar to that of Chavín. One individual, however—an older man buried in what appears to have been the remains of a military uniform—exhibited a $87\text{Sr}/86\text{Sr}$ value clearly outside of Chavín's range, raising interesting questions about his identity during this politically-volatile phase in Peru's history.

Sluka, Victoria (University of Wisconsin-Madison)

[3] *Knotting Accuracy & Dimension Variation in Modern Turkmen Carpets*
 A pilot study of pile carpet variation and error is carried out on ethnographic Turkmen carpets. No such work has been previously published, and so this analysis provides basic data and conclusions on carpet variation, including type and intensity of variation, to be used as a starting point for further study of archaeological carpet samples. Data is taken from six comparable carpets, informing on two aspects of carpet variation. The dimensions and knot densities of the carpets' motifs are used to examine the variation introduced to the carpets through technological limitations of an upright loom. The carpets are found to be well standardized, with overall dimension and density error rates within range of the published limits of human replication ability (approx. 3%). However, underlying trends in the distribution of this variation informs on the abilities and tendencies of the knotters to correct for limitations of the loom technology. The accuracy of weaving patterns is also analyzed, giving indications of the error rate of the knotters in a highly repetitive task. The knotting error rate is found to be far below the accepted limit of replication, indicating significant, though not uniform use of external aids of manufacture.

Small, David (Lehigh University)

[30] *Limited Territorial Control and Incomplete Political Economies in Small States: A Look at the Classic Maya and Classic Greek*
 The limited territorial control of small states, here the Classic Maya, has hindered the development of political economies in several cases. This paper looks at the issue of non-ruling elite interstate economic and political networks, and their effect on the evolution of internal political economies for the Classic Maya. Examples will be drawn from such polities as Copan, El Palmar, and Caracol. A further window into the dynamics of the effect of limited territorial control on political economies will also be drawn from similar examples among Classical Greek polities.

Smallwood, Ashley (University of West Georgia), Thomas Jennings (University of West Georgia) and Charlotte Pevny (SEARCH, Inc.)

[120] *Tracing Paleoindian Projectile Point Diversity in the American Southeast*
 Paleoindian projectile points occur in high incidences in the American Southeast, and compared to other regions in the East, the Southeast has the greatest projectile point diversity. One effective way to understand this diversity is by tracking broad-scale morphological variation in suites of point traits to build cultural lineages. In this paper, we take a more trait-specific approach. We trace changes in projectile point design to understand the evolution of specific point attributes that were under selection. Through this approach, we explore when and where certain aspects of point design were adopted, what traits were linked or co-adopted, and how these traits may have influenced point function. By tracing changes in specific technological design elements, we hope to identify some of the social and adaptive processes that resulted in such high regional point diversity.

Smallwood, Ashley [81] see Jones, Katherine

Smeeks, Jessica (Binghamton University)

[65] *A Post-Wari World: Late Intermediate Period Defensibility in the Huamanga and Huarpa Provinces of Peru*
 Following the collapse of the Wari empire (ca. AD 1000), a widespread demographic and settlement change occurred in the Ayacucho Region of Peru. People were moving away from the rich farmlands and ritual centers of the flatlands to settle on hilltops and ridges. Many scholars point to strategic defense as a cause of settlement shift during this period—the Late Intermediate Period (ca. AD 1000–1450), suggesting warfare was endemic, while others suggest the sites facilitated agro-pastoralism and warfare was sporadic. This paper presents the preliminary results of two pedestrian reconnaissance surveys conducted in July 2014 and July 2017 in the Huamanga and Huarpa provinces of Peru—the provinces surrounding the Middle Horizon (ca. AD 600–1000) Wari capital. During these surveys, in an effort to assess the role of defensibility in the settlement shift, we considered the general designs and arrangements of architecture at 15 Late Intermediate Period hilltop sites.

Smejda, Ladislav (Czech University of Life Sciences Prague) and Anna Pankowska (University of West Bohemia)

[29] *Reconfiguring Normative Funeral Rite in European Prehistory: Second Thoughts on Secondary Manipulation of Human Remains*
 Mortuary variability in European prehistory has long been perceived through the lens of Christian worldview from which the discipline of archaeology originally developed. Expectations rooted in this conceptual perspective inevitably shaped the ways that the archaeological record was approached and interpreted. As a case study we consider the Central European Bronze Age, on which we can deconstruct the traditional 'textbook' understanding of ancient funerary traditions. During this period, general development observed in formal cemeteries is characterised by the gradual shift from prevailing inhumation towards cremation, but with strikingly frequent finds of complete, partial, or disarticulated human skeletons in settlement pits and ditches. We argue that what is usually regarded as a normative burial, or its opposite, i.e. seemingly careless and non-ritual deposition of human remains, may be a very problematic categorization. Gradually accumulated evidence suggests that the most visible forms of human burial in the archaeological record may not have been the dominant type of treatment of the dead. According to our research, secondary manipulation and fragmentation of human bodies, which was turning them into objects of cultural patrimony that could be shared and curated, seems to have been the most frequent destiny awaiting the deceased.

Smiarowski, Konrad (CUNY Graduate Center), Christian K. Madsen (Greenland National Museum & Archives) and Michael Nielsen (University of Greenland)

[135] *From Medieval Wool Tunics to Bone Powder: Rapid Degradation of Norse Middens in Southwest Greenland*
 This presentation is one of the products of a series of ongoing inter-connected, international, interdisciplinary fieldwork projects coordinated by the North Atlantic Biocultural Organization (NABO) research cooperative since 2005 in Greenland. The projects drew upon more than a century of prior

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field research, where four generations of archaeologists described and assessed organic preservation conditions at their sites in several regions of the Norse Eastern Settlement. This created a unique form of “archaeological TEK” (Traditional Ecological Knowledge) that represents an invaluable guide into the changing preservation conditions since the late 19th century. Between 2005–2017 we conducted extensive coring surveys of over 100 Norse middens, and open area and small test excavations at over 15 sites. The results show a shocking and almost complete loss of once outstanding organic preservation in a region where only 60 years ago wood, bones, leather, wool, and feathers were recovered. Our findings draw attention to the destructive process of the modern climate change that has been affecting the organic preservation conditions for at least 60 years, and to the need to organize a circumpolar-wide, international response strategy to rescue the endangered sites and their unique cultural heritage before it is too late.

Smit, Douglas (University of Illinois at Chicago)

[295] *Geology and Governance: Colonial Andean Mercury Mining and the Marroquín Collapse of 1786*

The study of an event may seem in opposition to the investigation of deep time, yet it is difficult to analyze one temporal scale without invoking the other. This paper examines this paradoxical linkage of events and the *longue durée* through the case study of a catastrophic event in the Spanish colonial mercury mines of Huancavelica in the Central Andean Highlands. The Marroquín collapse of 1786 claimed hundreds of indigenous lives, and symbolized the late 18th century decline of Spanish governance in the Viceroyalty of Peru. While this disaster may appear to be a singular event, this paper argues that understanding the causes and consequences of this collapse requires an investigation of how three different temporal scales (geological, institutional, and quotidian) articulated with one another. By investigating how different forms of temporality become entangled with human action, this case study of colonial Andean mercury mining will highlight the spatial and material aspects of social transformation in the archaeological record.

Smith, Alexander (The College at Brockport, State University of New York)

[117] *Indigenous Persistence in the Balearic Islands: Carthaginian and Roman Colonial Engagements in the Western Mediterranean*

The Balearic Islands are the westernmost island group in the Mediterranean. Of the four main islands of the group, Mallorca and Menorca were home to an indigenous Iron Age culture known as the Talayotic people. Their story is considered a minor one by many historians in the grand narrative of Mediterranean domination by Carthage and then Rome. Nevertheless, the archaeology of these two islands has revealed fascinating evidence of the scope and effects of ancient colonialism by these two powers. The groups inhabiting these islands during Carthaginian contact as well as Roman conquest do not display a passive acceptance of colonial influences, nor does the archaeological and historical evidence evoke outright resistance. Yet these groups persisted in settlement structure, religious practices, and even in the funerary realm well into the first centuries C.E. Through the lens of colonial negotiation, it also becomes clear that the islands contained multiple groups of varying identities that cannot be simply understood as broadly “Talayotic.” This paper will examine the ritual evidence from sites on Mallorca and Menorca to understand the varying expressions of these island communities during this period of outside interaction at the end of the first millennium B.C.E.

[160] *Discussant*

Smith, Byron (Humboldt State University) and Marisol Cortes-Rincon (Humboldt State University)

[30] *Sub-tropical Agronomy on a Variable Landscape: Exploring Classic Maya Farming through Geotechnical Design and the Distribution of Edaphic Variables*

Late Classic hinterland agronomy presents a compelling glimpse into the socioeconomic dynamics of production and demand in the Three Rivers region. This project focused on a prominent house-group located 350 meters east of the site of Dos Hombres which was known to exhibit intensive agricultural strategies as well as a specialized degree of stone working. Additionally, a series of four karst depressions bordered the site and likely leveraged moisture demand resulting from agricultural needs as well as personal requirements. The goal was to delineate hinterland cultivation among the common Maya and to identify stratigraphic evidence of nutrient depletion resulting from exhaustive farming practices. The task of defining the breadth of agricultural strategies was accomplished through remote-sensing, field survey and excavation. Soil sampling was conducted along two terrace platforms and soils were analyzed using the ascorbic acid method for phosphorus determination in order to develop an index of phosphorus availability. While structural analysis of the site’s geotechnical features demonstrated regional cohesiveness in design, the scale of the land management strategy suggested a level of economic complexity witnessed through multiple lines of resource specialization. Soil analysis revealed sporadic evidence of unnatural Phosphorus distributions with increases occurring in subsoil regions.

Smith, Byron [18] see Cortes-Rincon, Marisol

Smith, Carolyn

[272] *Discussant*

Smith, Catherine (Indiana University)

[337c] *Discussant*

Smith, Cecilia (Texas A&M University)

[231] *Ethics and Best Practices for Mapping Archaeological Sites*

Principle 6 of the Society of American Archaeology’s Principles of Archaeological Ethics emphasizes archaeologists’ responsibility to publically report archaeological investigations with the stipulation that “An interest in preserving and protecting in situ archaeological sites must be taken in to account when publishing and distributing information about their nature and location.” This paper first provides a critical review of current geolocation sharing recommendations and practices, and then describes available methods for dealing with sensitive location data and suggested best practices. Particular attention is paid to geomasking techniques, which communicate observed spatial relationships while obscuring sensitive geographic coordinates. Currently, only two geomasking techniques are widely used in archaeology: aggregating archaeological site locations into grids or administrative units, or placing points that represent site locations at a particular distance from their true locations. These techniques, while useful, are part of a larger and growing suite of tools that visually convey spatial data without revealing sensitive site locations. Principle 6 allows researchers flexibility in tailoring methods of communicating site locations, which is useful given the range of archaeological contexts. However, this work encourages researchers to responsibly exercise that flexibility by incorporating archaeological and environmental data into an explicit decision-making process for representing those places.

Smith, Claire (Flinders University)

[166] *Zimmerman’s Influence on World Archaeology*

This presentation focusses on Larry Zimmerman’s contributions to world archaeology through his leadership roles within the World Archaeological Congress. This includes his various roles on the WAC Executive and Council and his convening of the first Indigenous Inter-Congress, held at Vermillion, South Dakota in 1989 and the subsequent development of the Vermillion Accord on Human Remains.

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Smith, Emily (Social and Behavioral Sciences, California State University, Monterey Bay), Taylor MacDonald (College of Arts and Science, Vanderbilt University) and Tiffany A. Tung (College of Arts and Science, Vanderbilt University)

[270] *Two Individuals, One Urn Burial from La Real, Peru: A Bioarchaeological Investigation of Urn Burial Practices*

The site of La Real, located in the southern, near-coastal region of Peru, was an elite burial ground where mortuary contexts reveal Wari imperial influence during the Middle Horizon (600–1000 CE). This study examines the mortuary treatment of two human fetus/neonate skeletons placed inside a decorated, ceramic urn and compares funerary treatment to Wari fetus/neonate burials and others in the Andes to evaluate the geographic reach, chronological depth, and cultural significance of this funerary practice.

To estimate age-at-death, the long bones and basilar occipitals were measured, indicating an age of 30–36 weeks in utero for both individuals.

Although we suspect they were twins, thus far no data support or refute that hypothesis. The urn was decorated with Nasca-influenced motifs, and the fetuses/neonates were wrapped in plain, cotton textiles and cotton ropes. Fetus urn burials have also been recovered at Conchopata, a Wari heartland site, and comparisons show some key distinctions. For example, the La Real urn contained a double burial, the fetal/neonate remains were wrapped in textiles, and no other artifacts were found in the urn. These distinctions reflect the importance of local mortuary practices in the face of Wari imperial influence in the region.

Smith, Geoffrey (University of Nevada, Reno) and Derek Reaux (University of Nevada, Reno)

[92] *Western Stemmed Tradition Projectile Technology and Raw Material Use in Guano Valley, Oregon*

Western Stemmed Tradition (WST) projectile points mark Late Pleistocene/Early Holocene occupations in the Great Basin. Considerable morphological variability exists among WST points and over the years researchers have come to recognize various types (e.g., Cougar Mountain, Haskett, Parman, and Windust). Because most substantial WST sites are near-surface scatters that likely represent palimpsests of multiple occupations, it remains unclear whether this variability reflects tools used during different time periods, tools discarded at different stages in their use-lives, or tools used by different groups visiting the same places. Using data collected from Guano Valley, Oregon, where one of the largest concentrations of WST points in the Great Basin was recently discovered by the University of Nevada, Reno, we explore these and other possibilities. To do so, we examine the relationship between WST point morphology and raw material type and whether particular WST point types cluster together or are instead generally intermixed.

Smith, Heather (Eastern New Mexico University)

[120] *The Manufacture of Northern Fluted Points: A Production Sequence Hypothesis*

Fluted projectile points have been found in the archaeological record of the North American Arctic for over 50 years. Only recently, however, have fluted points found in buried contexts associated with dateable materials and included in region-wide comparative analyses provided chronological, morphological, and technological evidence to support the cohesion of the Arctic specimens as their own fluted variant: the Northern Fluted Complex (NFC). Few sites have provided the opportunity to observe examples from the NFC discarded early in the production sequence, which can provide a glimpse of Northern manufacture protocols. This paper presents a hypothetical sequence of NFC point production developed using evidence from exhausted and discarded fluted point fragments, and a collection of rejected and damaged bifaces from four NFC sites. Discussion will address the integrity of the archaeological evidence for production stage by using multiple reduction indices, as well as an experiment re-creating NFC points using the manufacture sequence proposed. Conclusions address whether characteristics of the NFC reduction sequence can inform on the mode used to culturally transmit fluted point technology to the North.

[120] *Discussant*

[120] *Chair*

Smith, J. Gregory (Northwest College), Alejandra Alonso Olvera (INAH), Soledad Ortiz (UNAM) and Atasta Flores (ENAH)

[173] *Boundary Dynamics between Chichen Itza and Ek Balam*

Social boundaries of the past and present are usually nebulous, contested, and fluid. In this paper we examine the ancient towns and villages between the two Maya kingdoms of Chichen Itza and Ek Balam in northern Yucatán. We hypothesize that the boundary area between these two cities in the 9th century AD was based on Classic Maya concepts of ruler-centered polities but changed dramatically in the 10th century as Chichen Itza became a fundamentally different kind of Maya city the likes of which had never been seen before. As Ek Balam faded in power, smaller communities in the vicinity became tethered to Chichen Itza in a variety of ways. We focus our discussion on Ichmul de Morley, located halfway between Chichen and Ek Balam but supplement it with information from Santa Cruz, a small outlying site south of Ichmul that was the focus of our 2017 fieldwork.

Smith, Jaye, Kelley Hays-Gilpin (Northern Arizona University), Linda Pierce (Archaeology Southwest) and Chris Downum (Northern Arizona University)

[70] *The Ray Robinson Collection—A Successful Collaboration to Save Safford Basin Archaeological Artifacts*

In 1957, Arizona State Museum director Emil Haury, ranch owner Ray Claridge and geologist/avocational Ray Robinson visited the Bonito Creek site in Arizona's Safford Basin as reported by Wasley in 1962. Robinson returned to the site after that initial visit to "save" many objects that Haury did not take with him that day, along with "prospecting" other sites during the 1960s in the Safford Basin being threatened by development. For 59 years, Robinson preserved these objects along with limited provenience. Starting in 2015, at 100 years old, Robinson felt the need to ensure the objects' preservation after his death by making contact with numerous stakeholders who could help him find a "safe resting place" to "protect and keep it [the collection] together." Only through the collaboration of a diverse mix of archaeologists, anthropological departments, accredited repositories/conservation professionals, a non-profit organization and avocational volunteers, Robinson's desire became reality just months before his death and prevented the disbursement of the objects to the open retail market.

Smith, Jolene

[231] *Always Halfway There: Keeping Up with Digital Archaeological Data in Virginia*

Since being one of the first State Historic Preservation Offices to adopt electronic records management in the late '80s, the Virginia Department of Historic Resources has worked through several iterations of databases and web applications. These systems manage basic site information, details about physical collections, and now digital media and datasets themselves. Over time, the agency's priorities and objectives surrounding digital records and data have evolved in ways common to other institutions. As the most recent web GIS and database application reaches mid-life after four years, a thorough assessment of current and ideal approaches to digital data curation, preservation, and distribution is coming due as planning begins for what comes next. Building from concepts in libraries and archives, informatics, and data science, this presentation explores possible road maps.

[276] *Discussant*

[231] *Chair*

Smith, Kevin (Haffenreffer Museum, Brown University)

[277] *Moderator*

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Smith, Michele (Haffenreffer Museum of Anthropology)[277] *Moderator***Smith, Monica L. (UCLA)**[171] *Nature as Agent: Mass-Event, Incremental, and Biotic Perspectives*

The recent development of the "Anthropocene" as a distinct geologic era, added to a century's worth of scholarly discussion about the role of humans in their ecosystems, has solidified an interpretive view of humans as prime mover. Yet nature has a "mind of its own" relative to human knowledge, action, and volition. In this session, presenters will discuss the ways in which natural entities, ranging in size from mega-storms to viruses, have presented challenging conditions to which humans can only respond. We will examine mass-event phenomena as large-scale events that are interpreted as "catastrophic" visitations on the human landscape; incremental processes of vegetation, oxidation, and material fatigue and their effects on artifacts, architecture, and agricultural landscapes; and biotic agents from disease-causing microbes to intelligent commensals, birds, and domesticated animals. As an example of the co-dependent interactions between humans and nature, the introductory paper will also consider the way in which fire as a natural occurrence has been coopted by humans to result in profound changes at every scale of interaction, from the intimacy of the domestic hearth to landscape-transforming anthropogenic fire regimes.

[80] *Discussant*[171] *Chair***Smith, Morgan (Texas A&M University)**[244] *Stuck in the Middle: A Technological Organization Study on an Underwater Paleoindian Assemblage*

Unfluted lanceolate point types in the Southeast United States, including Suwannee, Simpson, Quad, and Beaver Lake, are poorly understood. A lack of robust unfluted point assemblages found in secure context in association with radiocarbon datable material has made interpreting these types difficult. However, a few sites in the Southeast contain unfluted lanceolate points within relative stratigraphic sequences or associated with extinct fauna. Based on this evidence from these sites, these styles are often attributed to the Middle Paleoindian period (~10,600–10,200 rcybp). The Middle Paleoindian period in North America is theorized to be a time of regional specialization and settlement following a phase during which people maintained generalized, adaptable toolkits suited for high mobility. However, the rarity of discreet Middle Paleoindian components in the Southeast has made this theory difficult to test in the region. Here, I examine the only site in the Southeast at which excavations have revealed a discrete Suwannee lithic component; the Ryan-Harley site (8JE1004) in North Florida. I present a technological organization perspective from Ryan-Harley to provide insight on Suwannee point makers and to test the theory of Middle Paleoindian regional specialization by examining patterns in land-use and technological provisioning through assemblage variability and tool-kit curation.

[244] *Chair***Smith, Ryan (University of Pittsburgh) and Sarah Kennedy (University of Pittsburgh)**[190] *Minimizing Distractions and Focusing on What Matters: Using Autonomous Drone Flight Technology to Examine Architecture across the Circum-Titicaca Basin (Puno, Peru)*

Drones have tremendously influenced how archaeologists can capture data, hailed as particularly "efficient" tools for our field. Such is the case, for example, in projects which aim to produce highly detailed basemaps useful for various site-level GIS analyses. However, despite radical developments within the past few years which have significantly improved accessibility and in-field usability, an under-represented reality is the unexpected challenges these technologies almost always present in the field. As a result, drone troubleshooting often takes away valuable time from principal research objectives. This poster presents results from a macroregional investigation of late prehistoric and early colonial architectural remains (AD 1000–1700) in the circum-Titicaca Basin of southern Peru. The authors pre-programmed fully autonomous drone flight paths as a novel approach to archaeological site mapping in order to reduce the amount of time tending to drone flight. Ultimately, while autonomous flight was not without challenges, initial testing of this methodology alongside more traditional manual flying methods at several sites across the Titicaca Basin demonstrates how pre-programming flights can alleviate many in-field technical distractions and cut down on the time necessary to capture systematic and site-wide coverage, thus allowing archaeologists to turn their attention to more important observations.

Smith, Scott (Franklin & Marshall College)[264] *Ceremonial Waterscapes: The Desaguadero River Valley in Antiquity*

The Lake Titicaca Basin in the Bolivian Andes was a dynamic place that saw the development of early religious centers like Chiripa and Khonkho Wankane, the subsequent emergence and expansion of the Tiwanaku state, and the incursion of the Inca empire. The Desaguadero River is the only river that drains Lake Titicaca, flowing south and connecting the region to the central altiplano and Lake Poopó some 250 kilometers downriver. This paper examines the ceremonial and political importance of the Desaguadero River itself. I draw on excavation, survey, and remote sensing data from the sites of Iruhito, Cerro Chijcha, Simillake, and Khonkho Wankane to explore the ways that the river actively shaped the ceremonial and political lives of residents of the region throughout the pre-Columbian period, and into the early Colonial period.

Smith, Susan and Karen Adams[115] *Plant Tales from Pueblo Bonito, Room 28*

The plant record of Room 28 is filtered through a complex stratigraphy composed of early excavation backfill from adjacent rooms, Room 28 features and floor, and below to an older surface. Plant specimens from 11 macrobotanical, 7 flotation, 10 maize cob samples, and 13 pollen samples reveal an exceptionally rich record of the resources valued and used by Pueblo Bonito people. Their reliance on maize registers strongly, supplemented by a mix of native foods including pinyon nuts, cacti, cattail, and small-seeded annuals. Imported Douglas fir wood, identified from charcoal, provides perspective into Chacoan connections with regional landscapes where special resources were obtained through trade or community efforts.

Smith-Guzmán, Nicole (Smithsonian Tropical Research Institute)[260] *The Bioarchaeology of Greater Chiriquí: Challenges, Finds, and Future Directions*

Greater Chiriquí, the pre-Columbian cultural sphere encompassing western Panama and southern Costa Rica, has been subjected to intense looting activities since the mid-19th century. Nevertheless, archaeological exploration of the area to date has successfully contextualized the nature and transitions of non-perishable material culture. However, organic remains rarely survive in funerary contexts due to the high acidity of the soil, high humidity, and high precipitation in this region. Human remains almost never remain in the stone-lined tombs of Greater Chiriquí, in which one or more occupants were buried (as evidenced by the number and placement of mortuary offerings). But in shell-bearing middens along the coast, the increased soil pH from high calcium carbonate contents allows better preservation of human and animal bone. These differences in preservation have led to a sharp division in the variety and quality of mortuary information derived from coastal (lowland) and inland (highland) sites. The present study traces the few examples of human remains recovered from archaeological sites in the region and what they tell us about the cultural activities and health of pre-Columbian populations. It will highlight the case of ancient cancer found recently in a 700-year old burial from Bocas del Toro, Panama.

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Smyth, Michael (The Foundation for Americas Research, Inc.)**[162]** *Preclassic Settlement Hierarchy at Xcoch in the Puuc Region of Yucatan*

Some of the earliest and largest monumental architecture in the Puuc Hills are found at the Maya center of Xcoch. Noted by John Stephens in 1841 as a large city with a deep water cave and gigantic pyramid, Xcoch is among a host of Puuc sites now dated to the Preclassic period. An interdisciplinary research program at Xcoch and vicinity from 2006 to 2013 revealed Preclassic Maya community patterns, megalithic architecture, and material culture for a developing complex society. Massive high building platforms, numerous stone pyramids and plazas, heavy stone habitation structures, and an internal site causeway connecting the large Gondola Aguada to the Xcoch grotto are among the many Preclassic settlement features extending across nearly 3 sq km. This paper examines Preclassic settlement patterns at Xcoch and its role as a regional center for the central Santa Elena plain and the greater Puuc region. Other Preclassic sites show mounting evidence for early megalithic architecture and formative ceramics supporting the presence of a multi-tiered hierarchy within Xcoch's immediate settlement orbit. These data suggest that Xcoch was a stratified society at the center of a formative regional settlement hierarchy centuries before the apogee of the world heritage site of Uxmal.

Snetsinger, Andrew (Past Recovery Archaeological Services Inc.) and Maxime Lamoureux St-Hilaire (Tulane University)**[147]** *Explaining Variability in On-Floor Assemblages: The Contextual-Behavioral Method*

Settlement abandonment studies are crucial for understanding the archaeological record, as they yield the key to decipher the context of on-floor deposits, or assemblages. We advocate the use of a behavioral-contextual method for studying on-floor assemblages for ascribing them to one of several categories of abandonment. This behavioral-contextual approach examines the vertical and horizontal architectural contexts of artifacts, the relative completeness of vessels, and the represented vessel forms in order to better understand on-floor assemblages. This method accounts for mundane and ceremonial abandonments of gradual and catastrophic nature, along with abandonment with anticipated return. The proposed method is framed in a visual model built on archaeological case-studies from across the Maya world. Most of the featured examples correspond to residential architecture, but this model should be applicable to other types of buildings. While it is far from exact, the interpretational framework that we propose allows to explain the variability of documented abandonment contexts and promises the avoidance of such equivocal terms as "problematical deposits".

Snitker, Grant (Arizona State University)**[177]** *Anthropogenic Fire and the Origins of Agricultural Landscapes during the Neolithic Period (7,700–4,500 cal. BP) in Eastern Spain*

Humans have intentionally set fires for millennia to transform the arrangement and diversity of resources within their landscapes, often altering the relationship between fire and ecosystems at multiple scales. Although scholars regularly identify human-altered fire regimes through paleoecological studies, archaeological research has not yet fully incorporated the spatial, temporal, and cultural dimensions of human-caused fire into discussions of the development of agricultural landscapes. This paper presents new, integrated research on anthropogenic fire and landscape change during the Neolithic period (7,700–4,500 cal. BP) in Eastern Spain. Using an analysis of charcoal morphology from sedimentary records, the spatial distribution of prehistoric land-use and fire across the landscape, and an ethnographic review of burning practices of small-scale agriculturalists, this project aims to better understand the socio-ecological processes that drove the pace and scale of agricultural landscape development during the Neolithic. This research builds on data and analyses from the Mediterranean Landscape Dynamics Project (MedLanD), a collaborative project between Arizona State University and the University of Valencia.

[234] *Discussant*

Snitker, Grant [221] see Bergin, Sean

Snoddy, Anne Marie (University of Otago), Charlotte King (University of Otago), Vivien Standen (Universidad de Tarapaca), Bernardo Arriaza (Universidad de Tarapaca) and Sian Halcrow (University of Otago)**[87]** *Nutritional Stress and the Maternal-Infant Nexus: Insights from Isotopes and Paleopathology in the Ancient Chilean Atacama (ca 9000–1500 BP)*

The Atacama Desert is a remarkably marginal environment. Children are vulnerable individuals and the perinatal and weaning periods are high-risk even under ideal conditions. Investigation of stress during early life is therefore vital to the characterisation of human adaptation in this region. We compared isotopic evidence for infant diet and stress with paleopathological data to assess potential changes in maternal and infant health between the pre-agricultural Archaic Period (9000–3500 BP) and early agricultural Formative Period (3500–1500 BP). Incremental isotopic analysis (δN and δC) was conducted on 14 individuals. Results show an increase in nitrogen isotope values suggestive of maternal stress during in utero development between the Archaic and Formative Periods. Additionally, 57% of Formative Period children analysed have carbon isotope values consistent with the use of micronutrient-poor maize-based weaning foods, while Archaic period individuals appear to have been weaned onto marine resources. Paleopathological analysis of individuals from the Archaic (N = 72) and Formative (N = 115) Periods shows a significant increase ($X^2 = 6.667$; $p = .010$) in the prevalence of scurvy (vitamin C deficiency), a disease of low dietary diversity. We discuss these findings in terms of adaptive mechanisms to resource scarcity, maternity, and food allocation.

Snow, Dean (Pennsylvania State University)**[119]** *Discussant***Snow, Meradeth (University of Montana)****[97]** *Genetic Identity and Relationships in the Southwest United States and Mexico*

The prehistoric occupants of the Southwestern United States and Mexico have many similarities, including maize agriculture and the Uto-Aztecan language family. A genetic relationship, potentially due to migration between the regions, has been investigated through mitochondrial DNA analysis. However, limited modern and ancient samples, a focus on the hypervariable region of the mitogenome, and limited samples from intermediate regions between the Valley of Mexico and the cultural complexes in the Southwest US, may have masked the maternal relationship between the regions. A larger sample size from modern populations in Mexico, as well as whole mitogenomes from geographically intermediate sites such as Paquime, have allowed for a better understanding of the two regions and their relationship. An analysis of modern and ancient, as well as full mitogenomes and solely the hypervariable region, will be discussed to better understand the genetic relationship between the regions and what this means regarding expansion of cultural complexes in the past.

[97] *Chair*

Snow, Meradeth [97] see Waller, Kyle

Snyder, Daniel (USDA-NRCS), Kathryn Whalen (SUNY Buffalo Archaeological Survey) and Douglas Perrelli (SUNY Buffalo Archaeological Survey)**[22]** *Using Debitage Analysis, MANA, and Landscape Utilization to Illuminate the Archaic-Early Woodland Transition in Western New York*

Recent CRM fieldwork in western New York by SUNY Buffalo Archaeological Survey has afforded the opportunity to address questions of how people, technology, and the environment related from newly discovered sites which span thousands of years. One of the most fruitful avenues of research is in

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the examination of the transition from the Late and Transitional Archaic to the Early Woodland, a period in which it is suggested there was dramatic linked cultural and environmental change, where multiple competing groups gave way to the Meadowood, a culture centered on a vast network which spread trade goods, idiosyncratic objects of great social significance, and a worldview which would unite people across the Northeast. This view is supported by lithic analysis, including in-depth debitage analysis which identifies idiosyncratic patterns for cache blade production between sites, Minimum Analytical Nodule Analysis (MANA) for raw material use, as well as correlations of landscape utilization between wetland/upland setting between time periods. The transition from the Archaic to Woodland time periods in archaeological literature, initially conceived of as a simple marker between aceramic and ceramic cultures, has proven prescient for reasons which more reflect the people behind these artifacts.

Sobolik, Kristin [294] see Ingraham, Robert

Soderland, Hilary (University of Washington School of Law)
[193] *Discussant*

Solazzo, Caroline and Jean Soulat (LandArc Laboratory, France)

[77] *The Trade of Tortoiseshell between the Caribbean and Europe during the 17th–18th Centuries: An Archaeological and Biomolecular Approach*

Tortoiseshell is made from the scutes of sea turtles; historically, hawksbill turtle was the main source of tortoiseshell but other species might have been used. Between the 17th and 18th c. tortoiseshell obtained in the Caribbean was traded on North American and European markets. Tortoiseshell was used for making combs, fans, boxes, in bookbinding, and as veneering for furniture. Excavations in European workshops (Paris and Amsterdam) attest of the use of this exotic material into luxurious items. However, archaeological fragments of tortoiseshell or artefacts have degraded, so that often the material has lost its recognizable tortoiseshell pattern, making identification to species difficult.

The carapace and plastron of sea turtles are covered with keratinous scutes mainly composed of beta-keratins, a category of structural proteins that stack together to produce β -pleated sheet structures. Here, reference materials from five species of marine turtles were characterized by proteomics analysis to build a database of beta-keratin sequences and determine robust markers for species identification. Preliminary data have shown significant differences between hawksbill and green turtles, allowing distinction of these species in ancient materials. In addition, comb fragments from archaeological sites and workshops in France were examined.

Soler, Ana Maria [89] see Lozano Bravo, Hilda

Soler-Arechalde, Ana (UNAM), Cecilia Caballero-Miranda (UNAM), Ma Carmen Osorio (UNAM) and Itzayana Bernal (UNAM)

[293] *Archaeomagnetic Dating Results of PPC Project*

Archaeomagnetism is a dating technique whose application has been rising. This technique originally required burned materials, but in certain Mexican archaeological sites, volcanic products with magnetic minerals were added to the stucco mix, enhancing the geomagnetic field record and allowing us to determine it in non-burned samples. Thanks to this the number of dating events increased, improving the detail of the chronologies; a clear example of this happened in Teopancazco's neighborhood. A detailed sampling of burned and non-burned stuccos sampled between 2015(31) and 2016(33) had been processed. The dates obtained will be analyzed and compared with other previous results in order to get a greater image of the development of Teotihuacan city.

Soleski, Anna Marie (University of Toronto, Department of Earth Sciences), Yiting Xu (Zhejiang University), Joseph R. Desloges (University of Toronto) and Zhou Lin (Zhejiang University)

[284] *Holocene Floodplain Development of Qujiang, Zhejiang, China in the Context of Early Human Occupation of Jinhua Basin*

The Qujiang drains mountainous terrain in Zhejiang Province of east-central China. Shangshan cultures have been identified on floodplain terraces and earth mounds within the Qujiang valley. The choice of settlement in the area (10,000+ years BP) is constrained by several geographical factors, including topography, climate, access to water resources and human factors. The relationship between cultural occupation sites and river dynamics over the Holocene is poorly known in this region. Lateral and vertical river stability can be an important determinate of land use and settlement patterns. We investigate the geomorphic record of the Qujiang in relation to the Hehuashan river terrace occupation site using geophysical methods (GPR) and cores on the adjacent floodplain to infer long-term floodplain stability. Floodplain structure is dominated by shallow narrow channels comprised of basal gravels and sand (4 m depth), overlain by horizontally laminated infilled silty sands. We interpret the long-term natural channel pattern of the Qujiang to be a cobble-bedded, sandy anabranching river, subject to rapid and frequent lateral channel shifting and formation of large back-swamps during heavy flooding. This suggests poor habitat for occupation on the river's floodplain and supports settlement on the adjacent Pleistocene aged river terraces.

Solinis-Casparius, Rodrigo (University of Washington), Christopher T. Fisher (Colorado State University), Anna Cohen (Utah State University), Juan Fernandez Diaz (NCALM/University of Houston) and Jason Bush (Defense POW/MIA Accounting Agency (DPAA))

[299] *Excavations at the City of the Jaguar*

The Mosquitia ecosystem of NE Honduras is a critical region for understanding past patterns of socio-political development and interaction between Mesoamerica and Central America. Caches of ground stone and other objects have long been noted for the region but have never before been systematically examined. Here we report on the recent partial excavation and consolidation of one of these deposits from the newly documented city of the Jaguar, Gracias a Dios, Honduras, constituting a deposit of several hundred stone, ceramic, and other objects. We find that 1) the objects were deposited in a single episode within a cleared ritual space, 2) objects were arranged into groups representing vulture, death, and were-jaguar motifs, 3) many objects were ritually broken, 4) ceramics and other materials placed on and around the central group may represent recurring veneration at this location. The Jaguar ofrenda represents an example of ritual behavior, sacred space, and material culture that may be related to the abandonment of the city sometime in the 16th century.

Solis, Kristina (University of Texas at San Antonio)

[105] *Late Holocene Climate Change and the Emergence of Hunter-Gatherer Territoriality in the Late Archaic Texas Coastal Plains: An Analysis Using Bioavailable Strontium*

The Late Holocene was a time of sea level stability, increased moisture, and abundant resources. Existing models suggest that this environment set the stage for population packing and territoriality. In this presentation, strontium isotope ratios from the Loma Sandia mortuary site (2800–2600 BP) are used to evaluate the emergence of territoriality among hunter-gatherer populations on the Texas Coastal Plain. Assessing territoriality with human strontium data is facilitated by determining the strontium ratios in the local geology. While it is common to obtain strontium isotope ratios from geologic regions through plants or substrate, they tend to show heterogeneity in a given area. Strontium ratios from animal skeletal tissue, known as bioavailable strontium, are more homogenous because they provide an average of an area. I present both strontium bioavailability data from modern fauna as well as the ancient human data to illustrate how strontium ratios from diverse geological areas are a useful tool for the study of emergent hunter-gatherer territoriality in the context of Late Holocene climate.

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Solis, Kristina [105] see Corl, Kristin

Solis, Reyna [209] see Melgar, Emiliano

Solorzano Venegas, Maria Soledad and Olga del Pilar Woolfson Touma (Escuela Politécnica del Litoral)

[46] *Proceso Constructivo en los Montículos Circulares Prehispánicos de Urcuquí / Constructive Process at Prehispanic Circular Mounds of Urcuquí*

El paisaje cultural arqueológico de Urcuquí se caracteriza por la presencia de montículos artificiales circulares—Tolas—, de la época prehispánica. Sus dimensiones promedio fluctúan entre treinta y cincuenta metros de diámetro y entre dos y cuatro metros de altura.

El objetivo de esta ponencia es proponer el proceso de construcción de estas estructuras, a partir de una relectura de la información obtenida del registro arqueológico de superficie y subsuelo empleando técnicas mixtas: excavación de un perfil expuesto y prospección geofísica de otros dos. Los resultados revelaron que el proceso inició con la planificación del lugar de ubicación y el tamaño de los montículos, seguido de la preparación del terreno mediante una excavación tronco cónica, cuya profundidad dependió de la altura que los constructores deseaban alcanzar en la obra arquitectónica, para proceder a la restitución del suelo y el levantamiento de la misma. En estas dos últimas tareas utilizaron bloques de tierra cruda, elaborados con puzolanas.

Somerville, Andrew (Universidad Nacional Autónoma de México)

[125] *From Neutral to Mutual: A Long-Term Perspective on Human-Rabbit Relationships in Highland Mexico*

Studies of human-animal relationships provide insights into multiple issues relevant to archaeological research, including changes in human-environmental interactions, subsistence strategies, and socio-cultural dynamics. This presentation investigates the relationship between humans and rabbits (cottontails and jackrabbits), which were among the most commonly consumed animals in pre-Hispanic Mesoamerica. Focusing primarily on the settlement of Teotihuacan in the Basin of Mexico during the Preclassic to Historical periods (~150 BC to AD 1900), the presentation explores human-rabbit interactions through both archaeological data and stable isotope analysis of preserved rabbit bones. Temporal patterns and trends are interpreted through the lens of niche construction theory, an ecological concept that prioritizes the changes that organisms make to their environments, and the ways in which these changes feed back and influence the organisms themselves. Ultimately, this paper suggests that the ecological niche created by the urban development of Teotihuacan favored new types of relationships between the human residents and commensal rabbit species, which were mutualistically beneficial to both organisms and had implications for the local economic and social organization of the city.

Somerville, Andrew [21] see Schwartz, Christopher

Sonderman, Eleanor (Texas A&M University)

[290] *Revisiting Conejo Shelter: Refining Cultural Chronologies of the Lower Pecos, Texas*

The Lower Pecos region of Texas is a remarkable study area, primarily because perishable artifacts (those made of plant materials, bone, and leather) survive in near pristine conditions in its very dry caves and rockshelters. Vaughn Bryant was among the first researchers in the region to use pollen data to build paleoclimatic and ecological chronologies from this region, his dissertation is still one of the most comprehensive analyses of this region's ecological past. Following this path, my dissertation focuses on Conejo Shelter, which Bryant also worked on in his graduate student days, back in the late 1960s. This rockshelter has a substantial, but under-studied assemblage of perishable artifacts including basketry, cordage, sandals, and coprolites. Thirty new, direct dates, using material from fiber sandals and coprolites, have formed the basis of a more fine-tuned radiocarbon chronology for Conejo Shelter. Esri ArcGIS has been used to incorporate new chronological data with information from the original excavation notes, in order to visualize the site's stratigraphy, better understand changes in the perishable assemblage through time, and track potential migrations of people and ideas between the Lower Pecos and adjacent regions.

Sonderman, Robert and Stefan Woehlke (National Park Service)

[202] *Our Sites at Risk: Climate Related Threats to NPS Administered Archeological Sites*

Over the past 15 years NPS archeological sites from Texas to Maine have faced devastating impacts from hurricanes and other climate related events. During this time, Hurricanes such as Isabel, Ivan, Katrina, Sandy and most recently Harvey and Irma have caused extensive damage to NPS archeological sites. Although not subjected to direct impacts from these recent hurricanes, National Capital Region (NCR) parks have been heavily damaged by their collateral impacts, typically in the form of flooding along the Potomac Valley. It is simply a matter of time before a major hurricane strikes right at the heart of the Nation's Capital, threatening sensitive archeological resources.

Over the past three years the National Capital Region has been gathering data and developing an assessment of park cultural resource vulnerabilities due to climate related threats to our parks. This brief presentation will discuss those threats and highlight how some NCR parks are addressing those threats.

Song, Jixiang (Sichuan University)

[336] *Prehistoric Agriculture in South Tibet: Archaeobotanical Perspective from Bangga Site*

To understand the evolution of agricultural economy in south Tibet, a large number of flotation samples and phytolith samples were collected during 2015–2017 field seasons at Bangga site. Preliminary analysis on these samples shows clues to the subsistence strategy, the nature of the site (pastoral or agropastoral) and probably the seasonality of the occupation of the site. Comparison with Changguogou site which is earlier in time indicates changes in subsistence strategy over time in this region.

Sørensen, Marie Louise [245] see Earle, Timothy

Soriano, Jewell [297] see Bruno, Maria C.

Soroush, Mehrnosh (Harvard University), Alireza Mehtash (University of British Columbia AND Harvard Medical) and Emad Khazraee (Kent State University AND Harvard University)

[71] *Automated Qanat Detection: Examining the Application of Deep-Learning in Archaeological Remote Sensing*

This paper presents the preliminary results of a collaborative project that seeks to develop a deep learning model for automated detection of qanat shafts on CORONA Satellite Imagery. Increasing quantity of air and space-borne imagery available to archaeologists and advances in computational science has created an emerging interest in automated archaeological detection. Previous studies have applied machine learning algorithms for detection of archaeological sites and off-site features, with varying success rates. In the last few years, tremendous success has been achieved in image recognition through deep learning, a category of supervised machine learning which is based on hierarchical representation learning. We have chosen to examine the application of deep convolutional neural networks for automated archaeological detection focusing on qanats. The methodological merit of the project is that qanat shafts are one of the most suitable archaeological features for pattern recognition. The analytical merit

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is that conducting comparative studies of qanat systems at a regional scale is predicated on mapping massive number of qanat shafts, which is impossible manually. Processing of big data generated through machine learning would allow us to examine how this sustainable water supply technology has been adapted to a remarkably wide range of water deficit environments.

Sosa, David [223] see Barket, Theresa

Sosa Aguilar, Danny and Bernardo Archuleta

[27] *Understanding the Landscape and Material Sources through Community Partnership in Abiquiú, New Mexico*

This paper aims to discuss how the success of community partnership has led to an understanding of the way people moved across the landscape in the past. Situated in northern New Mexico, the Pueblo de Abiquiú contains a rich history that dates back at least into 2,800–4,000 BP (Before Present). Using portable x-ray fluorescence spectrometry, obsidian artifacts found at the pueblo suggests that groups are bringing obsidian from at least three known local sources. However, there is an unidentified source within the artifacts collected. Community partner, Bernardo Archuleta, is helpful and knowledgeable about the many trails and access points of the Abiquiú landscape. This reinforces a stronger interpretation of the procurement and exchange routes between the material sources and the Pueblo de Abiquiú.

Soto Maguino, Jorge Luis [282] see Lofaro, Ellen

Soulat, Jean [77] see Solazzo, Caroline

Souleles, Daniel (Copenhagen Business School)

[170] *Discussant*

Southard, Liz (University of South Florida)

[188] *A Fishy Study on Site Aggregation and Construction at Florida's Crystal River (8C11) and Roberts Island (8C140 and 41) Sites*

Fishing economies are often described as a principal form of subsistence for prehistoric Florida communities. However, seasonality analyses on fish remains, which have the potential to reveal patterns pertaining to population aggregations and the pace of construction projects, are generally underutilized. This research uses marginal increment analysis of otoliths (fish ear-stones) to investigate whether seasonal deposition events were taking place at two Woodland period sites: the Crystal River site (8C11) and Roberts Island Shell Mound Complex (8C140 and 41). Here, I present the findings on seasonal patterns observed between midden, feature, and mound contexts.

Soza, Danielle (University of Arizona)

[218] *"Is This A Thing?": Opportunities and Results of the Rock Art Ranch NSF-REU Program*

From 2011–2016 Dr. E. Charles Adams and Richard Lange have organized and directed the Rock Art Ranch field school, a National Science Foundation Research Experience for Undergraduates (NSF-REU) Program from 2013–2016. Rock Art Ranch, located just southeast of Winslow, Arizona contains evidence of use/occupation from Paleoindian to Pueblo periods, and yielded a wealth of data that has inspired dissertations, masters theses, senior theses, and student projects. As a participant of the NSF-REU at Rock Art Ranch, this paper highlights the opportunities this specific project with Chuck and Rich has provided, in terms of undergraduate student training in field and lab methods as well as academic research. Beginning as a participant in this program, I chose to further my academic career as a graduate student at the University of Arizona, continuing to work with data from Rock Art Ranch. My paper will conclude with a brief summary of the results of my continued participation in this project through my master's thesis on hunter-gatherer landscapes and land-uses inspired Chuck and Rich's training through the NSF-REU Program.

Soza, Danielle [153] see Zedeño, Maria Nieves

Spahr, Tim (Cape Porpoise Archaeological Partnership)

[199] *Cape Porpoise Archaeological Partnership*

The Cape Porpoise Archaeological Partnership is an alliance between the Kennebunkport Conservation Trust and the Brick Store Museum. Its purpose is to conduct archaeological study of the islands in Cape Porpoise harbor located just off the coast of Kennebunkport, Maine. Evidence suggests that Historic and Pre-Historic Period archaeological sites are present. Sea level rise due to global climate change, however, is causing shoreline erosion damaging or potentially destroying these locations. Important information of past cultures is being lost before study can begin. This is why the Trust, which owns and manages these islands, supports archaeological research. An example of this erosion can be found less than five miles southwest of Stage Island at what was previously Strawberry Island. In the 1940's, Strawberry Island was home to a working farm with farmhouse and barn. Today it is a pile of rocks completely submerged at high tide. Global sea level rise is increasing at a rate of 0.14 inches per year. This gradual increase equates to greater storm surges and conditions will worsen. Without prompt action, important information about this little-known period of history; contact between pre-Europeans and Europeans will be lost forever.

Sparenberg, Jennifer (Maryland Historical Trust)

[159] *Scylla or Charybdis? Prioritizing the Investigation of Sites Endangered by Natural Hazards*

Maryland has 8,000 miles of tidal shoreline associated with the Chesapeake Bay and its tributaries and more than 12-percent of its surface area in floodplains. These high risk areas for flooding and coastal erosion contain about 40-percent of Maryland's archeological sites and presumably many more that have yet to be discovered. It is not feasible or prudent to excavate every endangered site, thus choices about which sites to investigate must be made strategically. This paper lays out a reasoned approach to the identification and excavation of endangered sites based on: developing and refining historic/prehistoric contexts; identifying gaps in those contexts, and prioritizing which sites to survey and excavate based on context, archaeological sensitivity, and vulnerability. Other natural hazards and the effects of climate change that will impact archeological sites will also be identified, as the approach to prioritization is applicable to all hazards, and as sites are at risk to more than erosion and rising waters. Finally, ideas will be presented on how to work with non-traditional partners, like emergency managers, to communicate the risks natural hazards and climate change pose to archeological sites and why it is important to "mitigate" those risks to sites.

Sparks-Stokes, Dominique (University of Cincinnati), Susan Allen and Alan P. Sullivan III

[153] *Deposition, Disturbance, and Dumping: The Application of Archaeobotanical Measures to Taphonomic Questions*

This study assesses the utility of archaeobotanical measures to recognize differential site formation processes, drawing on the Bronze and Iron Age hill fort site of Zagorë, in northern Albania, as a case study. The blanket sampling strategy for collection of flotation samples applied by the Projekti Arkeologjik I Shkodres (PASH) (2010–2014) during the site's excavation provides a complete record of archaeobotanical changes across the depth of each excavation unit. The use of small mesh sizes for the light and heavy fractions, 0.25 and 1.00 mm respectively, allowed for the recovery of small weed seeds and chaff remains. The recovered archaeobotanical remains, all of which are carbonized, are typically well preserved and include several cereal and pulse crops, such as barley, einkorn wheat, emmer wheat, millet, lentils, bitter vetch, and peas.

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Here, we compare archaeobotanical assemblages from two excavation units, one of which shows an undisturbed chronostratigraphic sequence of ceramics, and another in which ceramics from different phases are mixed. The bases for comparison are three separate volume-based density measures of archaeobotanical remains. We use statistical analysis to assess relationships between these measures and their correlation with ceramic data in each unit.

Spaulding, Britta (University at Buffalo)

[85] *Forgotten or Remembered? Rural-Urban Connections in the Modern and in the Past*

In the aftermath of the United States election in 2016, it was claimed that one reason for the outcome was that voters in rural areas were tired of being “forgotten” by the rest of the country. However, this statement is problematic in putting forth a rural-urban dichotomy that may not exist in modern times in the western world, and may have rarely existed in the past in the ways that some assert in popular media. While studying different forms of rural archaeology and landscapes, I have seen that rural forms of archaeology have often been sidelined for investigations into more “significant” urban remains. However, the archaeological record itself tends to indicate that a populace in a small farming, mining, timbering, or other rural-industrial economy is often not so very isolated, and vice-versa. Historical archaeology shows that dynamic interactions between the two “sides” mean that it is incorrect to assert strongly-drawn, almost “battle” lines between sections of society based upon where they live and work. I look at several comparative rural-urban studies, concentrating on the western world, to show that while economic activities may differ within a society, their overarching cultures, mores, and actual interactions create more cultural homogeneity than not.

Speakman, Jeff [35] see Napora, Katharine

Speakman, Robert, Victor Thompson (University of Georgia), KC Jones (University of Georgia), Isabelle Lulewicz (University of Georgia) and Carla Hadden (University of Georgia)

[222] *Academic Jobs in Archaeology*

Over the past three decades, competition for archaeology faculty jobs at North American colleges and universities has risen significantly. Although the numbers of doctorates in anthropology has increased by approximately 70%, the numbers of new faculty positions has remained relatively constant. The present study examines academic job market trends using data derived from the 2014–2015 American Anthropological Association AnthroGuide. We identify which universities are the most successful at placing Ph.D. graduates into faculty positions by ranking each university based on their market-share trends at the decadal level. We also discuss trends in academic job placement according to gender divisions. Our findings suggest that success in landing a faculty position is largely based on where one ultimately chooses to attend graduate school.

Speal, C. Scott (State of Connecticut)

[88] *Socio-economic Class Status and Health on the Roman Danube: Skeletal Indicators and Mortuary Treatment at Late Antique Viminacium*

Cross-culturally and through time, anthropologists have found that—within hierarchical societies—elites tend to manage resources and allocate risk primarily to their own benefit. There is little reason to believe that Late Roman Imperial frontier elites would have behaved any differently. This paper examines the archaeological relationship between biological ‘stress’ or health—as inferred from skeletal remains—and socio-economic status / class—as evaluated on the basis of mortuary treatment—at the Roman frontier city of Viminacium, located on the Danube River in modern day Serbia. Mortality estimates, paleopathology, skeletal lesions, and stature data are all applied in a conjunctive approach to complicated issues of health and socio-economic class under historically known conditions of intense status hierarchy.

Spears, Michael (Anthropological Research L.L.C.) and Saul Hedquist (Anthropological Research L.L.C.)

[72] *Overview of Traditional Cultural Properties in Relation to the NHPA and Bulletin 38*

The publication of National Register Bulletin 38 in 1990 highlighted the importance of living communities to historic preservation by establishing traditional cultural properties as places eligible for inclusion in the National Register of Historic Places (Register). While the concept of traditionally important places was not new in 1990, locations important to living communities had received varied, and often minimal, consideration under the National Historic Preservation Act (NHPA). By specifying how traditional cultural properties meet the eligibility criteria for inclusion in the Register, Bulletin 38 provides important guidance for documenting how places are important to living communities. Perhaps most importantly, the identification and consideration of traditional cultural properties requires meaningful consultation and collaboration between federal agencies and traditional communities. This approach heralded changes in the 1992 amendment of the NHPA that require federal agencies to consult with Indian tribes during Section 106 undertakings, and provide an expanded role to ethnography and the ethnographer in historic preservation.

Speller, Camilla [43] see Manin, Aurelie

Spellman, Christina [104] see Trigg, Heather

Spenard, Jon (Cal State University San Marcos)

[264] *The Hills Are Filled with Water; the Caves Breathe Rain: An Ideational Landscape Approach to Settlement Distribution at Classic Period Pacbitun, Belize*

On an isolated, steep-sided hill in the otherwise undifferentiated foothills of the northern Maya Mountains is the site of Sak Pol Pak, a secondary center of the pre-Hispanic (900 BC—AD 900/1000) Maya site, Pacbitun. Sak Pol Pak is a small site encompassing the entire hilltop, with no room for agriculture and is difficult to access, yet it contains the largest pyramid-temple outside of Pacbitun’s epicenter. At the foot of the hill is the deepest, and most complex cave system in the Pacbitun area—a primary landscape drain for the region—as well as several other unrelated karst landmarks. In this paper, we analyze Sak Pol Pak from a Mesoamerican ideational landscape perspective, specifically that mountains, caves, and water were inextricably linked in thought, to propose the site was a significant ceremonial pilgrimage shrine for Pacbitun. Drawing on ethnographic, ethnohistoric and iconographic sources demonstrating mountains were believed to be living guardians of the wildland, and filled with water, while caves were mouths, exhaling aromatic, smoke-like breath, filling the skies with rain clouds, we conclude two of the primary uses of this hilltop shrine were rain and agricultural rituals.

[264] *Chair*

Spenard, Jon [147] see Stanchly, Norbert

Spence-Morrow, Giles (University of Toronto)

[295] *Signs of History, Signs in History: Confronting the Past in Antiquity in the Jequetepeque Valley, Peru*

As architectural interventions on the landscape, structures considered to have ceremonial or ritual significance provide a means to regulate the temporalization of practice in material form. As built objects, monumental huaca structures in the Andes served to mark the *longue durée*, as their existence mediated and legitimized political order linked to the deep cosmological history framing mythic time, ordering the present and planning for the future. As physical and subjectified artifacts embedded in the landscape, ceremonial loci were the conceptual stages on which temporality was created,

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preserved, and continually reaffirmed. Located only a few hundred metres apart in the Southern Jequetepeque Valley Peru, the Formative site of Jatanca and the Late Moche site of Huaca Colorada represent two occupations separated by 500 years of abandonment. Although temporally distinct and archaeologically separated as two discontinuous communities within a shared landscape, excavations of both sites have suggested that the ceremonial structures of the later Moche occupation were strongly influenced by the presence of the architectural remains of the Formative period community. This paper will trace how specific spatial and ideological concepts stretched across time between these two communities and how their situation in the landscape mediated the construction of identity and personhood.

[320] *Discussant*

Spencer, Kaylee [30] see Werness-Rude, Maline

Sperandio, Emeline [88] see Ardagna, Yann

Sperling, Christopher (Fairfax County Park Authority—Archaeology and Collections Branch)

[251] *A Twitch or a Wink: A Search for Meaning in Coins, Cuffs, and Pottery from a Rural Virginia Assemblage*

There are countless ways to interpret archaeological assemblages. One can take a purely functionalist approach. Plates are for eating and cups for drinking; fasteners keep clothing from falling. However, confronted with a range of symbolically charged artifacts from a Late Colonial through Early Republic period site in Northern Virginia, one is tempted to draw upon our anthropological origins to find meaning. A cuff link commemorating the fox hunt as well as coins and pottery bearing classical imagery. Are they simply the artifacts of everyday life in late eighteenth through early nineteenth century rural Virginia? Do they speak to the how citizens of the new republic saw themselves or what they aspired for others to see? Could the symbology represent an understanding among enslaved persons of the inherent contradiction between American bondage and American freedom? To paraphrase a legendary quote, is a cigar ever really just a cigar?

[194] *Discussant*

Sperling, Stephanie

[328] *The Pig Point Complex: 10,000 Years of Mid-Atlantic (Pre)History*

Excavations at the Pig Point site have redefined our understanding of Native American history in the Mid-Atlantic. The site is located near the freshwater-saltwater interface on the Patuxent River in Maryland, an area tremendously rich in biodiversity, and radiocarbon dates from stratified deposits at the site span more than 9000 years; however, artifacts uncovered more than two meters below surface suggest people have lived in this area far longer. Features discovered at Pig Point include a Late Woodland feasting midden, Adena-influenced mortuary pits, and several Early Archaic hearths, to name a few. Recently, archaeologists ventured outside of Pig Point in order to better understand how this significant site fits into a regional cultural landscape. Several intact and well-preserved sites were discovered that help us understand how people lived along the East Coast in the centuries before Contact.

Spieß, Arthur [84] see Miller, Jacquelynn

Spikins, Penny (Department of Archaeology, University of York) and Gail Hitchens (Department of Archaeology, University of York)

[329] *An Emotional Challenge: What Can We Infer about Capacities for Social Emotions in Archaic Humans?*

Social emotions are central to human social lives, however whilst there has been much discussion about archaic human cognition in terms of analytical capacities, capacities in terms of social emotions are rarely discussed. A 'null hypothesis' of a lack of pro-social motivations is often assumed to be the most rational scientific perspective on how archaic humans felt towards each other. Over recent years accumulating evidence for complex social relationships in archaic humans argues against this null hypothesis however, leaving the issue of archaic human social emotions open to debate. Here we consider how to approach an understanding of capacities for social emotions in archaic species, reflecting on how social emotions are likely to have evolved and developing an evolutionary and cultural model of capacities for social emotions in archaic humans. We draw on archaeological evidence to explore what we can and can't interpret about how Neanderthals felt about each other.

Spivey-Faulkner, S. Margaret (Harvard University)

[58] *Indigenizing the Typology*

The typology is one of the archaeologist's oldest analytical tools and it pervades nearly every facet of archaeological research, whether explicitly or implicitly. Using theories of practice, ethnographic evidence of Native American classification systems, and an interdisciplinary understanding of human perception and pattern recognition, this work attempts to deconstruct and reconstruct the typology as a tool of archaeological analysis, with an eye toward creating a newly theorized typology to be used in Native North American contexts.

[58] *Chair*

Sportman, Sarah P. (Archaeological and Historical Services, Inc.)

[217] *From Frontier to Farm Town: Subsistence and Diet in Old Wethersfield, Connecticut, 1636–1750*

Recent excavations at the Webb-Deane-Stevens (WDS) museum in Wethersfield, CT, resulted in the discovery of deeply-buried portions of the 17th- and early 18th-century landscapes. The stratified deposits contain a rich assemblage of domestic artifacts, personal items, architectural materials, food remains, and cultural features. The preservation of these deposits is excellent and the faunal assemblages include large and medium mammal bones, as well as small mammals, birds, fish, and eggshell. English colonists first arrived on the site in the 1630s as part of the initial Wethersfield settlement and were among the first Europeans to settle Connecticut. Incorporating the methods of ethnohistory and historical archaeology, this study examines the WDS faunal remains in the context of primary accounts of hunting, fishing, animal husbandry, and diet to shed light on the ways European settlers adapted to the Connecticut frontier and, in turn, impacted the local environment. The data also helps us to understand how English foodways and food procurement strategies evolved as the Connecticut Colony became more established in the 18th century.

Sportman, Sarah P. [294] see Leslie, David

Springate, Megan

[220] *A Queer Look at a Changing Vacation Landscape: Respectability and Resistance*

Using a queer lens, this research looks at respectability and resistance at a resort landscape on Lake George in New York State's Adirondack Mountains. In the late nineteenth century, this vacation resort served a mixed gender, middle-class clientele; beginning in the very early twentieth century, it has served a mixed-class, all female clientele. Respectability played a crucial role in how people navigated both of these landscapes. The flip side of respectability is resistance. Looking at artifact assemblages representing clothing, medicine, and foodways through a queer lens provides a glimpse of how respectability and resistance played out on the shores of Lake George in the 1870s-1890s and in the 1910s-1920s.

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Spurr, Kimberly (Museum of Northern Arizona / Past Peoples Consulting)**[325]** *More than Just Cliff Dwellings: Results of Survey at Navajo National Monument, Arizona*

The Museum of Northern Arizona (MNA) is collaborating with the National Park Service to complete a comprehensive survey of Navajo National Monument in northern Arizona. The spectacular cliff dwellings of Keet Seel and Betatakin have been known to science since the early 1900s, but no comprehensive inventory has been conducted of the entire monument. Survey in 2016 focused on the mesa top and canyons in the vicinity of Betatakin, resulting in the discovery of two smaller contemporaneous habitation sites, two probable Archaic camps, and several historic sites related to Navajo herding and NPS infrastructure development. The probable Archaic camps are particularly significant because no sites of this age had been identified in the Monument although Archaic sites are common in the region. Survey around Inscription House resulted in the discovery of new petroglyphs and buried cultural horizons. Early in 2017, survey in the canyon surrounding Keet Seel documented several prehistoric and historic trails cut into bedrock, historic inscriptions, and two previously unknown buried sites.

St. Amand, Ani (University of Maine Climate Change Institute), Alice R. Kelley (University of Maine) and Daniel H. Sandweiss (University of Maine)**[135]** *Assessing Destruction Risk of Cultural Resources: Primary and Secondary Impacts of Climate Change on the Archaeological Record*

Coastal archaeological and historic sites increasingly face primary impacts of climate change, including sea level rise, flooding, and erosion. As cultural sites are subjected to destructive processes, action is generally limited to mitigation and salvage of immediately threatened significant sites, while their destruction by the resettlement of affected communities has been given little attention. This secondary impact of climate change threatens sites outside of the immediate zone of flooding and erosion. Given the importance of cultural heritage sites to descendent communities, and their preservation of paleoclimatic and environmental records in association with the record of human settlements over millennia, it is imperative that we develop standard methods for assessing destruction risk of archaeological sites within a climate change framework. Using Casco Bay area in Maine as a pilot study, this study develops a methodology for integrating decadal-to-centennial climate change projections, socio-economic and demographic data, and state and federal land use and cultural resource management regulations to create a robust, user-friendly risk assessment framework. The products are multi-scalar maps at the town and parcel level that can be used by communities and government officials to identify and prioritize threatened cultural resources facing destruction by secondary impacts of climate change.

Stackelbeck, Kary (University of Oklahoma), Allison Douglas (University of Oklahoma), Shawn Lambert (University of Oklahoma), Bonnie Pitblado (University of Oklahoma) and Meghan Dudley (University of Oklahoma)**[222]** *Many Pathways to Stewardship of Oklahoma's Past and Present*

True to the title of the 2017 Oklahoma Archaeology Month poster, its creation involved an extensive collaborative effort. The theme celebrates both the long-standing education and outreach efforts of the Oklahoma Archeological Survey and the founding of the Oklahoma Public Archaeology Network (OKPAN). OKPAN sponsored the competitive recruitment for an artist to conceive the poster, which generated multiple submissions and spawned other creative partnerships. The poster displays an original, innovative design that incorporates multimedia content contributed by American Indian nations, state and federal agencies, professional archaeologists, land owners, and avocationalists. With images from over 20 federally recognized Tribes, the contributions provided by indigenous communities represent a particularly poignant example of the poster's message of inclusive archaeology. The authors emerged from this process feeling like we had been part of a unique experience worth sharing with others—thus the impetus for this presentation.

Stackelbeck, Kary [127] see Maggard, Greg

Stafford Jr., Thomas W. [74] see Devière, Thibaut

Stagg, Sarah and Jason Toohey**[240]** *Rock Art and the Creation of Landscape at Callacpuma, Peru*

Numerous rock art panels dot the landscape of the Late Intermediate Period (AD 1000-AD 1450) site of Callacpuma in the Cajamarca Basin of northern Peru. The panels are comprised of many distinct motifs and types including a variety of camelids, anthropomorphs, geometric patterns and other zoomorphs. Although the iconographic information held within these motifs is certainly important, this project attempts to move beyond the iconographic significance of individual motifs or panels and examine the use of rock art to form the landscape. At Callacpuma, art is spread across large portions of the site and more than 80 panels have been surveyed and systematically recorded to date. GIS analysis is used to examine the spatial patterning of the panels, focusing on the relationship between rock art, important physical features, and elevation. Consideration is given to the spatial relationship of rock art motifs and panels and how these patterns can be used to infer the function and meanings of rock art in shaping the physical and social landscape at the site.

Stalla, David [89] see MacDonald, Brandi Lee

Staller, John (The Field Museum)**[86]** *High Altitude Maize (*Zea mays* L.) Cultivation in the Lake Titicaca Basin and Endemism*

Scientists have long maintained the upper limits of maize (*Zea mays* L.) cultivation was 3,600 masl. Archaeological evidence has documented a particular maize variety called tunqu by indigenous speaking populations, generally cultivated on terraces around the Copacabana Peninsula between 3810 to 4100 masl, in the Lake Titicaca Basin, Bolivia. This is the first known maize variety cultivated above 3600 masl. There were wide-spread landscape modifications such as raised fields and terraces geared to the cultivation of food crops by pre-Columbian civilizations of this region. Colonial accounts emphasize this high altitude maize was primarily consumed as maize beer (aqha, or chicha) and central to ritual offerings extending back to the Yaya Mama religious tradition (ca. 800 BCE). Its phenotypic characteristic are unique, unlike any other known landrace. It appears to be an endemic maize variety, unique to this part of the Titicaca Basin. Evapotranspiration around the lake reduces the diurnal variation in temperatures just enough for maize cultivation to be possible in the Bolivian altiplano. Its prehistory, cultivation, preparation and consumption among indigenous cultures are analyzed as are its botanical and biological characteristics.

Stampanoni, Filippo [240] see Ellis, Grace

Stanchly, Norbert (AS&G Archaeological Consulting), Jon Spenard (California State University, San Marcos), Terry Powis (Kennesaw State University) and Christophe Helmke (University of Copenhagen)**[147]** *Broken Molds, Burned Wealth, and Scattered Monuments: Defining the Terminal Classic Period at Pacbitun*

The Terminal Classic period in the southern Maya Lowlands was one of great social transition, witnessing the disruption of long-standing economic systems, and the downfall of divine kingship. The manifestation of this "collapse" in the artifactual record has been well documented at many sites throughout the Belize Valley, yet how it does so at the site of Pacbitun, on the southern rim of the Belize Valley, remains poorly understood, in spite of nearly three decades of archaeological research there. This paper is the first attempt to define the Terminal Classic period at Pacbitun, focusing on

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three main aspects of this time period. The first is on changing patterns in the ritual landscape, where we have documented a marked uptick in intensity and geographic extent of the use of landmarks such as caves, rockshelters, and bedrock outcrops. The second area is related to economic exchange and rising power of secondary elites manifest in the appearance of molded-carved pottery, and lastly, we discuss the breaking, scattering, and reuse and abandonment of monuments in the site core.

Stanchly, Norbert [43] see Bentley, Heath

Standen, Vivien [87] see King, Charlotte

Standen, Vivien [87] see Snoddy, Anne Marie

Stanford, Dennis [79] see Graham, Russell

Stanley, Jeff (George Mason University), Mariela Pérez Antonio (Universidad Veracruzana) and Nawa Sugiyama (George Mason University)
[293] *Spatial Distribution of Ceramic Sherds at the Plaza of the Columns, Teotihuacan, Mexico*

During the Early Classic period (250–550 CE), Teotihuacan in what is now central Mexico was the largest city in the Western hemisphere. Occupying 76,400 m² of Teotihuacan's ceremonial center, the Plaza of the Columns, which consists of three mounds and the surrounding area, has been posited as the site of a palatial-administrative complex. The occupational history of the Plaza of the Columns is interpreted in light of a three-dimensional distribution map of ceramics, organized according to two factors: temporal phase and vessel form. Ceramic data includes over 99,000 pieces from multiple areas of the Plaza analyzed thus far, excavated during the 2015 and 2016 field seasons. Mapping the distribution of ceramic temporal phases should allow us to align the various excavation contexts chronologically and trace the usage of particular areas over time. The distribution of ceramic forms, meanwhile, can help identify the extent of household and public activities.

Stanley, Kaitlin

[50] *Bone Artifacts from Summer Bay, Unalaska*

Situated in Alaska's eastern Aleutian Islands on Unalaska Island, the Summer Bay site dates to 2,000 years BP. Over 700 osseous objects representing various manufacture and use stages have been recovered. Among these are harpoons, fish hooks, labrets, points, wedges, awls, and needles. These are primarily made from sea mammals and avifauna. Although Summer Bay represents one of the most secure dates of the Amaknak Phase (3,000 to 1,000 years BP), minimal research has been done to better understand the social organization, site function, and abundance in variation of technology. Presented here is the preliminary study from the analysis of the osseous industries of Summer Bay using the concept of chaîne opératoire. These results allow for the interpretation of the degree of recycling and rejuvenation between and within various tool types in this assemblage.

Stanton, Christopher (New Mexico State University), Jennifer Byrd (New Mexico State University) and Vanessa Carrillo (New Mexico State University)

[106] *Challenges of Archaeology in the Wilderness at South Diamond Creek Pueblo*

Archaeological excavation in the wilderness is a new frontier in archaeological data collection. With most of the documented and excavated sites being outside the wilderness, usually within driving distance of a town or city, this offers an untouched and uncorrupted view of past cultures and their material remains. Most archaeology conducted in the wilderness takes the form of surveying, with little to no excavation being done. The South Diamond Creek Pueblo Project offered us one of the first opportunities to do a complete excavation in the wilderness. Through a collaboration between the U.S. Forest Service and New Mexico State University, students and volunteers were able to completely excavate and collect data from a Classic Mimbres period Pueblo. We shall discuss the entirety of the project, from its first rediscovery in modern times through the completion of excavation, including the challenges we faced while working at an archaeological site in the wilderness.

Stanton, Travis (University of California Riverside)

[177] *Maya Ceramic Technologies for Avoiding the Catastrophic Failure of Cooking Pots*

Maya potters in the towns of Muna, Mama, and Ticul have historically used a calcite crystal to temper cooking pots due to its perceived role in mitigating the negative effects of thermal shock. When a clay cooking pot begins to be used it is exposed to extreme temperature variations which lead it to experience catastrophic failure at a higher rate than many ceramic vessels used for other activities. In this paper we discuss the results of experimental archaeology using calcite crystals in thermal shock tests and compare data to tempering materials in Preclassic and Classic period ceramics from the site of Yaxuna, Yucatan.

[258] *Discussant*

Stanton, Travis [66] see Palacios, Horvey

Stanyard, Zachary (Western State Colorado University)

[6] *Initial Experimental Analysis of Soft Hammer Techniques in the Maya Lowlands*

Lowland Maya lithic studies have traditionally focused on the rise of specialization at large urban centers. While many of these studies have focused on form and function of the tools produced, few focused on the technological means of tool production. Maya lithic studies have been assumed a priori to have been created using traditional means of hard-hammer and billet reduction. This paper reviews current evidence for the use of hardwoods in the production of stone tools, as well as provide an experimental comparison of debitage assemblages from Colha, an ancient Maya stone tool production site in northern Belize, and one created by myself using traditional reduction techniques and hammers crafted from tropical hardwood.

Stapleton, Charles (Northern Illinois University) and Maria Stapleton (Northern Illinois University)

[31] *Tlaloques, Tiemperos, and Trees: Cultural Models of Nature in Central Mexico*

Abundant water-related art and architecture produced by Teotihuacanos and Mexica-Aztecs in the central Mexican highlands coupled with the rhetoric of today's farmers from the same region regarding the catastrophic impacts of changes in local seasonal rainfall patterns make it clear that access to rainwater has always been a crucial factor for agricultural success in the semi-arid highlands of central Mexico, especially in communities that lack a reliable water source for irrigation. We collect a rich body of specialist knowledge regarding local understandings of relationships between animals, plants, hills, trees, humans, elements of weather, supernatural/spiritual beliefs, and farming practices that is widely shared in one such community of agriculturalists. Although this traditional knowledge has long been transmitted from generation to generation of agriculturalists, it is now in danger of permanent loss due to major shifts away from subsistence farming among the community's youth. We employed semi-structured interviews, free-listing, and experimental tasks to elicit specialists' conceptualizations of nature. Preliminary findings include a graded valuation of crops, natural and supernatural entities conceived as agentive in bringing rain, animals seen as bearers of knowledge of climatic change that humans can read, and human ability to predict and directly alter local rains and storms.

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Stapleton, Maria (Northern Illinois University) and Charles Stapleton (Northern Illinois University)**[36]** *Pueblo de Indios: Syncretic Art and Architecture in the Negotiation of Indigenous Identity*

In the years immediately following the conquest of the Aztec empire by the Spanish crown, there was a period of transition in which acculturation, adaptation, and/or adoption of new configurations of political powers, religion, and social structures ushered in the Colonial period in Mexico. One of the results of the encounter between indigenous and Spanish cultures is the syncretism that developed in the art and religious architecture of this region. Studies of syncretic art in colonial Mexico primarily focus on art produced in major convents built in previous pre-Hispanic cities and/or in new towns of New Spain. However, much less is known about the small indigenous towns or pueblos de indios beyond the cities states, cabeceras or major towns. How did they respond to their new circumstances? This study reveals how Tlanalapan—a Texcoco tributary town in pre-Hispanic times, an Indian town during the Colonial period in the New Spain, and an agricultural-industrial town today in the central highlands of Mexico—not only adopts and adapts to the new circumstances, but also uses the syncretic art of a Franciscan church facade, a crucifix made of corn, and local traditions as instruments to negotiate its own identity.

Stapleton, Maria [31] see Stapleton, Charles

Stark, Miriam, Peter Grave (University of New England (Australia)), Lisa Kealhofer (Santa Clara University), Darith Ea (APSARA National Authority (Kingdom of Cambodia)) and Boun Suy Tan (APSARA National Authority (Kingdom of Cambodia))**[175]** *Urban Economies and State "Peripheries": Angkorian Stoneware Ceramic Production and Distribution*

Angkor's agro-urban capital covered more than 60 square miles, and its landscape housed farmers and artisans. Constraints of the archaeological record limit our ability to document production scale of most activities; the genealogical skew of Angkor's epigraphic record in another reason. Yet Greater Angkor's gardens and fields must have fed residents in the Angkorian state's epicenter. Artisans built its temples, sculpted temple images, and cast metal goods; specialists and communities tended temples; and voracious elites broadcast political and religious affairs in stone and through pageantry. Some archaeologists studying the multiscale, multicentric nature of Angkorian production focus on ceramics as proxies for tracking state economy within and beyond Angkor's urban epicenter. Stoneware ceramics were neither wealth nor staple finance; their functions complemented earthenware and metal objects; and they were ubiquitous in Angkorian households across the kingdom. Kiln excavations in three discrete Angkorian subregions have produced in-situ ceramics; field projects across Cambodia offer samples from consumption sites. Our Khmer Production and Exchange Project dates stoneware kilns and uses NAA to characterize geochemical compositions of stonewares from production and consumption sites. Here we examine ceramic consumption in the Mekong Delta (Angkor's southern 'hinterland'), and its relationship to economic centralization the Angkorian capital.

[317] *Discussant*

Stark, Miriam [175] see Heng, Piphah

Steel, Louise (University of Wales Trinity Saint David)**[117]** *Contesting Landscapes. Hidden Histories vs. Memorialised Spaces in Cyprus*

People's relationship with place plays a significant role in shaping, contesting and (re-)negotiating identities. This paper considers place as an active agent in the mediation of modern Cypriot identity against a backdrop of centuries of colonial occupation. The focus is Arediou, south of the Green Line. Here, I explore how experiences of the past are embedded spatially but are also experienced differently according to their relationship to current narratives of being (Greek-)Cypriot and memories of occupation by the colonial other.

The slipperiness of Cypriot history, how certain spaces are remembered and memorialised while others are ignored or actively forgotten, demonstrates the intangibility of the past. Different narratives are attached to different phases of the Cypriot past: antiquity is concealed within a cloak of Hellenism, while the more recent Orthodox past is revered with great pride, and the turbulent recent past is proclaimed through the very name of the local kafeneio, the Parthenon.

Drawing upon local stories passed down over the generations, I explore how places within and around the village (local archaeological sites, copper mines, residues of British colonial activity, EOKA hideouts, abandoned villages) are variously remembered, forgotten, understood and represented, to actively create a sense of being Cypriot.

Steele, Teresa E. [89] see Martisius, Naomi L.

Steelman, Karen (Shumla Archaeological Research & Education Center), Liam Brady (Monash University), John Bradley (Monash University) and Amanda Kearney (The University of New South Wales)**[180]** *Dating the Spirit Men: Radiocarbon Dating Saltwater Rock Art of the Yanyuwa People in Northern Australia*

Working with Yanyuwa elders, we collected seven rock painting samples for radiocarbon dating from Kamadarringabaya rock shelter on Vanderlin Island in the southwest Gulf of Carpentaria (Northern Territory). Hand motifs—prints and stencils—dominate the site, covering the shelter walls and roof, and are said by Yanyuwa to be the hands of the Namurlajanyugku spirit beings. In control experiments, negligible levels of humic acid contamination were shown to be present in the unpainted rock; therefore, no chemical pretreatment was conducted on paint or background samples. To obtain direct dates on the paintings, we oxidized organic material in paint samples using plasma oxidation followed by accelerator mass spectrometry radiocarbon dating. Radiocarbon results were averaged using the R_Combine function of the OxCal computer program with ShCal13 curve data to produce calibrated age ranges. We also conducted a mineral analysis on samples using X-ray diffraction to identify mineral pigments used in the production of motifs. This project blends scientific dating of pigment-based rock art, archaeological analysis of spatial distribution patterns of rock art styles across the landscape, and ethnography through interviews to explore how people negotiate their contemporary relationships to rock art.

Steelman, Karen [180] see Roberts, Victoria

Steele, Benjamin (Western Carolina University) and Ashley Schubert (University of Michigan)**[119]** *Movement and Interaction in the Appalachian Summit circa 1300–1500 CE*

The Appalachian Summit is the southernmost and highest part of the Appalachian Mountain system, extending across western North Carolina and eastern Tennessee. Beginning in the early 1300s, evidence for Mississippian practices appear within Late Pisgah phase communities in the central portion of the Appalachian Summit. These settlements include small farmsteads, palisaded villages, and sites with platform mounds. In addition to the Pisgah culture, the late Mississippian Qualla phase (1450 -1838 CE) represents the only other Mississippian society in the Appalachian Summit. These communities are contemporaneous with Late Pisgah sites to the north, sharing similar house architecture and pottery attributes. However, Qualla sites are restricted to river valleys within the southwest while Pisgah pottery is found across a much larger area of the greater southern Appalachians. These two Mississippian complexes maintained a spatial separation within areas where both pottery types are found. With cycles of more or less integration of Mississippian groups, the period of 1300–1500 CE was a complex and dynamic period of interaction and growth in the Appalachian Summit. These

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demographic trends could be attributed to several factors, including environmental change, increased interaction with groups from neighboring regions, and increased competition for resources between neighboring communities.

Stein, Martin (Bureau of Land Management, Carlsbad Field Office) and Laura Hronec (Bureau of Land Management, Roswell Field Office, N)
[261] *Tough Love—The Permian Basin Programmatic Agreement Research Program in Southeastern New Mexico*

First implemented in 2008, the Permian Basin Programmatic Agreement (PBPA) is an alternative form of compliance with Section 106 of the National Historic Preservation Act of 1966, as amended. The PBPA allows the oil and gas industry and potash mining companies in southeastern New Mexico to contribute funding for archaeological research in lieu of requiring a class III archaeological inventory within the PBPA Area, provided they avoid recorded cultural resources. This paper describes the context in which the PBPA was developed, research completed, challenges it's encountered, and suggestions for how this kind of compensatory mitigation could be implemented in future land management elsewhere.

Steinberg, John (UMass Boston)

[167] *The Viking Age Settlement of Iceland: The Change from Migrant Society to Settled Society*

The rapid settlement of Iceland has a distinct beginning, but defining the end of the settlement turns out to be difficult. While there are anecdotal stories of earlier settlers, the beginning of large-scale migration to Iceland seems to happen in about AD 870, at the start of Harald Fairhair's reign, and the time of a distinct volcanic ash layer. The landnám, or land-grab is an important template for our understanding of movements into new landscapes, from the Neolithic Revolution, to the English Pilgrims, and the California Gold Rush. Does the migrant origin of a society define its later nature? Specifically, is the end of the landnám in Iceland reflected in one or more inflection points or is the change from migrant society to settled society imperceptible? This paper argues that by about AD 1100, the last vestiges of the Viking-Age migrant society vanished, and while the Norse themselves might not have noticed, the change seen in the archaeological record is profound.

Steinbrenner, Larry (Red Deer College)

[263] *"Across the Agua to Managua" and beyond: Getting Past Migration in Nicaraguan Prehistory*

Despite being the largest country in Central America, Nicaragua's archaeological record remains the least explored and most ignored. One consequence of this is that reconstructions of Nicaragua's prehistory have tended to rely overmuch on rather sparse (and not necessarily reliable) ethnohistoric accounts in which migration from Mesoamerican homelands is heavily emphasized, generally to the detriment of other kinds of cultural phenomena, including indigenous developments that are not explicitly "Mesoamerican". Meanwhile, only sporadic attention has been paid to the archaeological record itself, and the potential evidence that it provides for (a) actual migration and/or conquest, (b) interaction and mobility between groups within Nicaragua and beyond, and (c) multiculturalism across Greater Nicoya. This paper argues that understanding of Greater Nicoya's multicultural prehistory would benefit from approaches in which archaeological interpretations are informed but not dominated by ethnohistoric evidence—approaches that not only treat migration as a cultural phenomenon that must be demonstrated in the record rather than taken for granted but which also are capable of recognizing archaeological evidence of potential interaction between diverse groups.

Stelle, Lenville (Illinois State Archaeological Survey)

[180] *Pictographs on Artery Lake, Bloodvein River System, Extreme Northwest Ontario, Canada*

The pictographs of the Bloodvein River, Artery Lake, Ontario offer an important view of rock art design and purpose during the late prehistoric period and perhaps continuing well into the nineteenth century. All images are finger applied and utilize iron oxide based pigment. The sites appear to be of varying function. The largest and most complex consists of seven or eight panels and may reveal a narrative of healing associated with the Fourth Degree of the Midewiwin or Ojibwe Grand Medicine Society. The second appears to be a signpost indicating correct travel routing. The third consists of a substantially degraded panel and is of uncertain purpose. The iconography may be dominated by a representation of Mishipeshu (Mishibijiw) or the Underwater Panther. All three sites are subject to the forces of cryoturbation peculiar to boreal North America. Additionally, while Artery Lake is extremely remote (two weeks travel by canoe from the nearest road-head) insofar as the Bloodvein is a designated Canadian Heritage River there are a measurable number of informed visitors to the sites, many of whom are motivated to extensive photo documentation of their grand adventure. This circumstance has created uncommon difficulties for site preservation.

[180] *Chair*

Stellmach, Caitlyn [223] see Munger, Tressa

Stemp, W. James (Keene State College) and Jaime Awe (Northern Arizona University)

[147] *Point Counter Point: Interpreting Chipped Chert Bifaces in a Terminal Classic "Problematic Deposit" from Structure A2 at Cahal Pech, Belize*

Sixteen small chert bifaces are part of a Terminal Classic (AD 800–900) peri-abandonment "problematic deposit" recovered just above the surface near the western base of Structure A2 at the ancient Maya site of Cahal Pech, Belize. The results of stylistic, technological, and use-wear analyses performed on these chert artifacts indicate: 1) production from locally available stone; 2) five different tool styles; 3) evidence for some tool curation/re-sharpening; and 4) wear patterns on some of the artifacts that are consistent with their use as hafted stabbing or projectile weapons. Based on this evidence, as well as the other artifacts associated with them and their context of recovery, the sixteen bifaces are evaluated in terms of different processes of deposition, including midden contents, grave goods, abandonment refuse, and ritual offerings.

Stephens, Jay (School of Anthropology, University of Arizona) and David Killick (School of Anthropology, University of Arizona)

[242] *Assessing the Suitability of Southern Africa for Archaeological Provenance Studies with Lead Isotopes*

Evidence for trade between southern Africa and the Muslim world dates back to the 8th century CE. However, it is not until the 12th and 13th centuries, with the discovery of alluvial gold in southern Africa, that entanglement between the two regions intensified. As a result, state-level societies emerged and began incorporating aspects of the Muslim identity into their own culture.

With the intensification of these trade relations, craftsmen began expanding their repertoire of iron and copper metal production to include tin and bronze materials. Thus, were these new materials imported? Is this a case of technology transfer? Or perhaps an independent invention of bronze in southern Africa? We present data from chemical and lead isotopic analyses on copper and bronze objects from Bosutswe, Great Zimbabwe, Mapungubwe, Rooiberg, Thulamela, and Verwoert, as well as a lead isotopic database of sulfide ores from the region of southern Africa. Initial ore results indicate a heterogeneous array of lead isotope data, including the major prehistoric mines of Phalaborwa, Rooiberg, Copper Queen, Tsumeb, Kimberly, and Messina. Results from the analysis of metal samples are preliminary, but elaborate on the nature of intra and inter regional trade networks in prehistoric southern Africa.

Stephens, Stephanie (National Park Service)

[276] *Discussant*

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Stephenson, Keith (USC Institute of Archaeology and Anthropology) and Karen Smith (University of South Carolina)**[228]** *A Retrospect of Deptford in South Carolina*

The label Deptford has long been synonymous with both a Woodland Period pottery type and a coastally oriented subsistence-residential adaptation. The former culture-historical terminology dates to 1939, while the latter concept is attributed to Milanich following his work on the Georgia coast in the early 1970s. Deptford also has been construed as a phase with a time-space-content connotation that incorporates aspects of both pottery and adaptation. Regardless of the specific meaning the term Deptford may hold, much of the foundational literature on Deptford comes from sites on the Southern Atlantic Coast, particularly those on or near the lower Savannah River. A synthesis of Deptford for the whole of South Carolina was not seen until much later, when Trinkley included Deptford in his volume on the Woodland Period in South Carolina, completed in 1990. While it seems like yesterday, it was, in fact, almost 30 years ago. What do we know now that we did not know then? How far has our understanding of this Woodland Period manifestation come? We build on the work of Trinkley and others in a reassessment of some key aspects of space and time for South Carolina Deptford.

Steponaitis, Vincas (UNC-Chapel Hill)**[291]** *The Location of the Historic Natchez Villages, Revisited*

In the 1720s the Natchez nation, as described in contemporary French accounts, consisted of at least six towns: Grand, Farine, Pomme, Tioux, Grigra, and Jenzenaque. Building on the work of Andrew Albrecht, Ian Brown, and James Barnett, and taking into account eighteenth-century manuscript maps that have recently come to light, I re-examine the evidence for the nature of these towns and where they were located on the modern landscape. Apparent inconsistencies between narrative accounts and maps are reconciled by showing that the French applied different names to the same towns. Thus, the names Farine and Carnard referred to the same community, as did Grand and Valeur. Contemporary maps indicate that the layout of the civic-ceremonial capital was more complex than previously assumed.

Sternberg, Robert**[152]** *Moderator***Sterner, Katherine (University of Wisconsin-Milwaukee), Robert Ahlrichs (University of Wisconsin-Milwaukee), Dan Wendt (Minnesota Historical Society) and Larry Furo****[89]** *Testing Adaptive Efficiency: A Comparison of the Durability of Stone and Copper Projectile Points*

The Old Copper Complex represents a unique temporally and geographically bounded technological phenomenon. Binford (1962) challenged the idea that copper tools were adopted by Native Americans solely because they were technologically more efficient. He argued that Archaic copper served a primarily socio-technic function based on two assumptions. One, that copper tools were more efficient in use performance than their stone and bone counterparts. And two, that the energy expenditure required for raw material acquisition and production of copper tools was much greater than that for other material types. This socio-technic designation has formed the baseline for interpretations of the Old Copper Complex for the past 60 years. However, no one has tested these underlying assumptions about the relative economic efficiency of stone and copper tools. This study documents the experimental production and use of copper and chipped stone projectile points in order to test these assumptions.

Sterner, Katherine [26] see Jeske, Robert

Steussy, Clara**[39]** *Mono no Aware: Challenges of Impermanence in the Archaeological Record of a WWII Japanese American Concentration Camp*

From 1942 to 1945, the third largest city in the state of Wyoming was the Heart Mountain Relocation Center, one of ten camps where Japanese immigrants and their Japanese American descendants had been forcibly relocated from their homes along the West Coast for the duration of World War II. During their residence, the incarcerated did everything they could to make the camps their home, establishing gardens and fields, building swimming pools and root cellars, and otherwise trying to make life comfortable. After the camps were closed at the end of the war, however, they vanished from the landscape, as buildings and land were both given away to new homesteaders. In this paper, I offer a broad overview of how these involuntary settlements have both vanished from sight and yet still linger. In particular, I focus on the gardens and agricultural fields of the Heart Mountain camp, neither of which were clearly documented at the time and both of which now lie beneath active agricultural fields today. I ask what, if anything, can be done to extend our understanding of these areas, and discuss plans for continued research.

Steussy, Cally [268] see Van Alst, Emily

Stevens, Craig (American University)**[67]** *Maryland's Josiah Henson: A Tale of Black Resistance*

Josiah Henson was an escaped enslaved individual and eventual Underground Railroad conductor, yet his life story has been historically overshadowed by the fictional character he inspired in Harriet Beecher Stowe's internationally renowned novel, *Uncle Tom's Cabin*. The Maryland-National Capital Park and Planning Commission (M-NCPPC) and Montgomery Parks of southern Maryland utilizes archaeological research as one of many techniques to bring to life the narrative of Josiah Henson the individual, rather than Uncle Tom the fictional character. This paper highlights the integration of archaeological and GIS methods to facilitate the investigation of Henson's life in Rockville, Maryland and public dissemination of his narrative. As a member of this archaeological project, I created a storymap of the Riley plantation where Henson was enslaved during the early 1800's. This map introduces potential donors to the site and serves as a virtual self-guided tour for the site's upcoming museum. As Henson's influential life story is brought into mainstream understanding and made available to a broader public via technology, we are able to combat the historic belittlement of African-American achievements and contribute to the larger story of Black resistance to slavery.

Stevens, Karen (University of Kentucky), Katharine Alexander (University of Kentucky) and Alexander Metz (University of Kentucky)**[84]** *New Approaches to Old Questions: Current Research Objectives for the Green River Valley Shell Midden Archaic, Kentucky, USA*
The Green River Valley Archaic shell middens (ca. 10,000 to 3000 BP) located in west-central Kentucky have a long research history dating back more than 100 years to C. B. Moore's work. Previous research programs have focused on mortuary analysis, subsistence, formation processes, and settlement patterns, laying the groundwork for future researchers to conduct more detailed analyses using newly developed methods (e.g., GIS, isotopic analysis). In this paper, we expand on previous research of the Green River Valley shell middens by describing aspects of site functions and site contents, as they relate to ecological and social contexts. This ongoing work includes 1) paleoethnobotanical research considering the scarcity of Eastern Agricultural Complex crops, either as the result of prehistoric plant use, preservation, and/or recovery strategies; 2) faunal research examining freshwater resources as paleoenvironmental indicators through species composition and isotopic analysis, and 3) GIS-based spatial analysis investigating topographic and ecological features associated with patterned re-use of shell midden locations in the Green River Valley.

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Stevens, Rhiannon (University College London, Institute of Archaeology), Hazel Reade (University College London), Sophy Charlton (The Natural History Museum & University College Lo) and Jennifer Tripp (University College London)

[219] *The UpNorth Project: Environment Context of Late and Final Palaeolithic Dispersals*

Human mobility and environmental interactions at the end of the Palaeolithic were undoubtedly influenced by large-scale and rapid climate change. With the melting of ice sheets and expansion/contraction of ecosystems, new landscapes and resources became available to late and final Palaeolithic hunter-gatherers. The UP-NORTH project is examining the dispersal of people and animals into Northern Europe after the Last Glacial Maximum. Using a range of techniques, including stable isotopes, radiocarbon and ancient DNA analyses, UP-NORTH is exploring whether the process(es) of recolonisation and the increasing diversification seen in the lithic and bone industries during the late and final Palaeolithic represent responses to changing environments and resources, or if such changes were independent of one another. UP-NORTH is developing an integrated chronological, palaeoclimatic and palaeoecological framework to explore changing landscapes, and human activity within them. By developing multiple integrated lines of evidence the project provides an insight into the Late-glacial landscape and environment change that Palaeolithic people experienced and evaluates how these may have influenced the decisions they made, particularly in relation to their mobility.

Stevenson, Christopher [20] see Ladefoged, Thegn

Stewart, Ashley (University of Alabama), J. Lynn Funkhouser (University of Alabama), Avery McNeece (University of Alabama), Christopher Lynn (University of Alabama) and Omega Rakotomalala (Eagles Wings Montessori School)

[168] *Anthropology Is Elemental: Teaching Children Using a Four-Field Approach*

Public outreach and education are essential for the future of archaeology. While many organizations are actively involved in informing the public on the value of archaeological knowledge and the importance of preservation, the majority of in-depth education on archaeology and anthropology as a whole remains at the university level. Anthropology is Elemental is an education and outreach program that teaches four-field anthropological concepts to elementary school students through a service-learning course. This course uses applied anthropological techniques that allows graduate and undergraduate anthropology students to learn through experience while serving the community. Doctoral students serve as course instructors while guiding master's and undergraduate students as they instruct and engage with elementary pupils. Through team-teaching and interactive lesson planning, lectures and activities are developed specifically for young children, which are then made available to the public through an open access database. Assessments conducted throughout the semester gauge lesson effectiveness and indicate what concepts need to be revisited. As anthropology is rooted in the sciences and humanities, these classes convey cross-cutting concepts and encourage critical thinking at an early age. By exposing the next generation to anthropological topics, they gain an appreciation for and understanding of culture, science, and the past.

Stewart, Brian (University of Michigan)

[174] *On the Trail of Homo through Earth's High Mountains and Plateaus*

Of Earth's habitable landscapes, mountain environments present humans with some of the most striking adaptive challenges. But they also offer unique opportunities. Cross-cultural comparative research on montane hunter-gatherers in prehistory has focused on the settlement of expanses of contiguous high-elevation terrain—the world's 'high plateaus.' Yet plateau peopling represents one chapter in a much longer evolutionary story of when, how and why ancient people engaged with upland landscapes. This was a human odyssey spanning hundreds of millennia, multiple hominin taxa and continents, the world's high plateaus, but also its much more widespread high-mountain systems. To date, little effort has gone towards investigating the full variability of montane lifeways through time and space. This symposium will bring together archaeologists studying hunter-gatherer biocultural adaptations in diverse upland settings across the globe. What were the timings, motives and modes of montane exploitation, and can we elucidate the evolutionary processes by which our genus engaged with upland landscapes with increasing frequency and intensity? With these questions at the fore, this presentation introduces the session by exploring its rationale, themes and aims.

[174] *Chair*

Stewart, Brian [174] see Zhao, Yu-chao

Stewart, Christina (University of Oklahoma)

[269] *An Analysis of Biscuit Ware Ceramic Standardization in the Lower Chama Watershed, New Mexico*

The Classic period (AD 1350–1598) in the Lower Chama Watershed of New Mexico was a time of rapid population growth and coalescence. Despite these dynamic population shifts, this time remains largely understudied. In this research, I examine the social dynamics of coalescence in the Lower Chama Watershed by analyzing changes in biscuit ware production at Sapa'uinge (LA 306), the largest Classic period pueblo in the region. Biscuit ware is a locally produced whiteware common at Sapa'uinge which makes it a good proxy for local changes in production. Archaeologists have proposed that biscuit ware ceramic become more standardized over the Classic period. In this study, I use an attribute analysis to investigate changes in biscuit ware production and standardization at Sapa'uinge over the site's occupation to test if biscuit ware indeed becomes more standardized. I argue that biscuit ware does become more standardized over time and is reflective of the broader social and economic consequences of coalescence in the Lower Chama Watershed.

Stewart, Mathew (PANGEA Research Centre, University of New South Wales, Australia)

[41] *The Unexpected Fauna of Pleistocene Saudi Arabia and the Earliest Evidence of Hominin Butchery Activity*

Work in the Nefud Desert, Saudi Arabia, has been fundamental for establishing the importance of the Arabian Peninsula for Pleistocene hominin populations and their dispersals out of Africa. Recent palaeontological and archaeological exploration in the Western Nefud Desert has uncovered numerous fossiliferous palaeolake deposits and associated archaeology. Fossil assemblages include taxa with both African and Eurasian affinities and indicate a greater diversity in large mammals than resides in the region today. Furthermore, the presence of species such as *Hippopotamus* and *Alcelaphus* strongly support an ameliorated climate with expansive grasslands and large, perennial lakes. Favourable conditions likely permitted and promoted an influx of taxa, while subsequent climatic deterioration would have resulted in faunal retreat and/or extirpation. The presence of hominins in Arabia during the Pleistocene is evidenced by fossil remains, stone tools and anthropogenically modified bone, and their dispersal into Arabia was most likely tied to the establishment of favourable conditions and concomitant influx of large herbivores. This is perhaps best exemplified by the relatively diverse large mammal assemblage at Ti's al Gadah (TAG) and the accompanying evidence for anthropogenically modified bone from various fossiliferous deposits, suggesting repeated hominin dispersal events into the Western Nefud Desert during the Pleistocene.

Stiglitz, Alfonso [14] see Van Dommelen, Peter

Stine, Linda (University of North Carolina Greensboro)

[228] *The Quaker Farm That Wasn't: Archaeology at the Smith Farmstead*

During archaeological field work at a North Carolina central Piedmont farmstead (~1870–1940) researchers collected information on numerous landscape features, a standing structure, and remnants of other log buildings. The site contained unusually well-preserved leather goods, metal

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artifacts, and metal trash piles; however very few ceramic or glass artifacts were discovered in spite of the volume of earth moved and sifted. Oral history, documents, and archaeological evidence will be explored to interpret this site.

Stock, Jay [198] see Arthur, John

Stocker, Sharon [298] see Karkanias, Panagiotis

Stone, Mary Louise

[273] *Power as Nurture: The Inkas and Their Tiwanaku Ancestors*

Religion bonded Andean societies across centuries (Moseley 1992; Kolata 1995) and archaeologists request greater focus on religious ideologies to evaluate the Andean past (Kolata 2000; Hastorf 2007)—gaping silence in the scholarship surrounds the so-called “female, spiritual” side of society. From this hurin moiety (Rostworowski 2007; Silverblatt 1987), particulars of an overarching hegemonic strategy of power-as-nurture emerged among the Inkas (and with different details among their Tiwanaku ancestors).

Women and men colleagues from the author’s twelve years living in communities around Puno and La Paz seek to share their perspective of dynamic gender balance and daily reciprocity with spirit—held in oral narratives, ritual practices, and social organization. Imperfect compliance does not negate long-lived, fundamental principles that survived changes over time—which provide more nuanced reasoning than brute force and violent arguments as the sole origins of states.

Inkas origins of Cusco and everyone were honored in paqarina pilgrimage sites that organized the empire; local/regional domination revolved around Copacabana, Pachakamaq, and Cusco’s Qurikancha. Nurture for subjects emphasized maize production and storage. Spiritual authority that tended many emanated from Cusco and Titiqaqa, Inka and Quya. Together, these hurin features characterized much of Inka fame besides colorful warriors and golden statues.

Stoner, Edward and Geoffrey Cunnar (Western Cultural Resource Management, Inc.)

[38] *The Pequop Projectile Point Type Site in Goshute Valley, Northeastern Nevada and Implications for the Long and Short Chronology Debate in the Great Basin*

In a 1995 study of the chronological patterning of Elko Series and Split-stemmed projectile points, Bryan Hockett concluded that neither type entirely matches the patterns of the Bonneville or Lahontan Basins; and the neither area represents good chronological analogues for northeastern Nevada. Dart points recently found in the well dated context of a stratified open site in the northern Goshute Valley exhibit characteristics of both early side-notched and corner-notched types. Comparison of these points those found in Early Archaic contexts in the Bonneville Basin and other regions suggest that many of them may have been routinely misidentified as Elko Series points and not an earlier transitional point type. In this paper, we propose a new temporally diagnostic projectile point type and explore the implications that the identification of what we term “Pequop points” may have on the refinement of Great Basin chronology and on the Long and Short debate.

Stoner, Edward [87] see Cunnar, Geoffrey

Stoner, Wesley (University of Arkansas)

[262] *Production and Exchange of the Earliest Ceramics in Central Mexico*

Compositional studies in central Mexico have largely focused on serving wares of the later Teotihuacan and Postclassic periods. Studies of the region’s earliest ceramics of the Formative period have been almost completely ignored. The earliest ceramics made in the region tend to be much coarser than the later serving wares, so we cannot use the existing reference databases to source them. Here we build the Formative reference database with a large sample of chemical and petrographic data generated from the earliest ceramics found in the Basin of Mexico, the Teotihuacan Valley, the Toluca Valley, western Puebla, Tlaxcala, southern Hidalgo, and eastern Morelos. We add Formative ceramics opportunistically sampled from the Soconusco, the Tehuacán Valley, and Pánuco in northern Veracruz for comparison. While the objectives of this study were not intended to highlight long-distance exchange, both regional and interregional trade of ceramics were identified. These patterns of interaction were key in producing the interregional style horizons that developed during the Early and Middle Formative periods in Mesoamerica.

[152] *Discussant*

[262] *Chair*

Storozum, Michael [198] see Goldstein, Steven

Stottman, M. Jay [94] see Henderson, A. Gwynn

Stout, Dietrich (Emory University), Justin Pargeter (Emory University), Nada Khreisheh (Emory University), Katherine Bryant (Emory University) and Erin Hecht (Georgia State University)

[227] *The “Molecular Genetics” of Social Learning: Skill Acquisition and Individual Differences in Learning*

Although commonly glossed as social “transmission,” the acquisition of knapping skills requires extended interactions between social inputs and individual practice better termed social “reproduction.” Individual differences in learning aptitude during this process provide both the raw material for neurocognitive evolution and a potentially significant source of variability in the lithic products used to infer patterns and mechanisms of Paleolithic social learning. Here we present results from an experimental neuroarchaeology study of individual variation in handaxe-making skill acquisition. Naïve subjects received ~100 hrs training over several months, accompanied by regular behavioral, psychometric, and MRI assessments. To quantify skill, knapping performance was observed after every 10 hrs training and rated using a systematic rubric. We fit a multivariate model of artifact metrics to these ratings to derive an objective “quality” score and regressed quality scores on hours practice per subject to derive individual learning curves. The multivariate model identifies morphological correlates of knapping performance whereas parameters and values from individual learning curves can be directly compared with individual differences in brain structure and psychometric performance. Our results are an initial step toward better understanding the roles of skill acquisition and differential aptitude in generating lithic variability and shaping human neurocognitive evolution.

Stout, Dietrich [227] see Beney, Megan

Stowe, Michael (Department of Defense)

[157] *Settlement Pattern Analysis at the Medicinal Trail Community, Northwestern Belize: Results of Topographic Mapping from 2013-*

This poster presents the results of five field seasons of intensive survey and total station mapping at the Medicinal Trail Community, a Maya hinterland settlement in northwestern Belize. Mapping during the summer of 2017 has further refined our understanding of the size and distribution of households and numerous landscape features that have been, or continue to be, the focus of excavations. Refinements to the topographical mapping within the

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area has revealed several complex household groups associated with ridge tops, as well as an extensive network of artificial terraces, drainages and reservoirs associated with dense settlement.

Strait, Madeleine (Barnard College of Columbia University)

[259] *Skin and Bones: The Presence and Potential Implications of Dog Skinning in the Pre-Colonial Southwest*

The presence of dogs across burial sites in the southwestern United States and worldwide has been well noted in archaeological literature. The ubiquity of canine burials attests to their historical role as complex social actors in human society, prompting actions and performances, taboos and transgressions. To access the true depth of meaning in many canine remains, then, we must examine them with the level of precision normally reserved for human burials. This paper offers a close reading of the remains of four dogs buried in Room 822, a D-shaped kiva from T'aitöna (Pot Creek Pueblo). These dogs were ritually buried and show evidence of having been skinned before interment. The cultural significance of skins and dogs is analyzed in this paper through engagements with both descendant oral histories and folklore, as well as the theory of Amerindian perspectivism best known through the writings of Viveiros de Castro. When viewed through these lenses, the taphonomic evidence of skinning provides an important new understanding of the social and ritual role of dogs in the pre-colonial Southwest and argues for the importance of dogs as culturally rich participants in the human past.

Strauss, Stephanie (The University of Texas at Austin)

[128] *The Epi-Olmec Conundrum: Looking for Answers in All the Wrong Places*

Epi-Olmec is a nebulous term, adrift in both time and space. Weakly defined by a set of slippery contrasts—isolated from what came before and what comes after—the descriptor lacks robust categorization of its own. And yet in spite of this hollow terminology, the words “Epi-Olmec” themselves are so politically fraught that certain scholars have adopted the even more obfuscatory term “Isthmian”, a label growing in popularity within the literature. This paper begins the process of defining Epi-Olmec in its own right. Whether understood primarily as a time period, geographic region, visual culture program, or hieroglyphic system, Epi-Olmec art and writing have much to offer the study of early Mesoamerican material culture. Rather than setting Epi-Olmec apart from more robustly-defined predecessors, neighbors, and successors, this paper will use Epi-Olmec visual culture to inform upon them. What connections can be drawn, for example, between Epi-Olmec forms and Classic Veracruz deities? How might an understanding of Classic Veracruz iconography illuminate the complexities of Epi-Olmec supernaturals? By upending the historic practice of “reading” Epi-Olmec art through a Maya/Izapan lens, this paper will instead turn toward the west, opening a new avenue for the study and definition of Epi-Olmec visual culture.

Strawhacker, Colleen (National Snow and Ice Data Center), Peter Pulsifer (National Snow and Ice Data Center), Noor Johnson (National Snow and Ice Data Center) and Shari Gearheard (National Snow and Ice Data Center)

[195] *Data Sovereignty for Indigenous Communities in the Arctic: Ensuring Ethical Control of Information and Knowledge for Indigenous Partners through Digital Tools*

The Exchange for Local Observations and Knowledge of the Arctic (ELOKA, eloka-arctic.org) partners with Indigenous communities in the Arctic to create online products that facilitate the collection, preservation, exchange, and use of local observations and Indigenous Knowledge of the Arctic.

ELOKA has created numerous digital products guided by Indigenous partners, ranging from atlases preserving and visualizing Indigenous Knowledge and information, to online databases allowing for Arctic residents to upload local observations to share among other individuals, villages, and organizations. This paper will overview various online tools, prototypes, and partnerships that demonstrate how digital tools can enable information, data, and knowledge sovereignty for Indigenous communities in the Arctic to ensure full control over their information. These efforts include extensive consultation with communities, technical strategies to restrict or open sharing based on community needs, and plans to build infrastructure to ensure community control over information. Our focus on data sovereignty ensures that deeply embedded local and Indigenous Knowledge cannot be used in ways that can bring harm to the communities and their Knowledge holders and that the communities have full control over how the information is used and shared.

Strayer, Jessica [134] see Layco, Wendy

Street, Megan [335] see Rosenfeld, Silvana

Stretton, Sean [210] see Arthur, Kathryn

Striebel MacLean, Jessica (Boston University)

[220] *Destabilizing the Planters Prospect: The Embedded Landscapes of White Creole Masculinity at an 18th-Century Plantation House in Montserrat, West Indies*

At the close of the 18th century, a planter's dwelling overlooking the Caribbean Sea on the northwest coast of Montserrat was destroyed by fire, and never reoccupied. Archaeological excavations yielded an intimate portrait of the domesticity of the British Empire materialized in fragments of everyday life. Little Bay was a small-scale sugar plantation with a physical landscape that conformed to the logic of sugar production—planting fields, sugar works, and the dwellings of the laboring enslaved. The location of the planter's dwelling, atop a high promontory, achieved the “planters ideal”, allowing for the simultaneous surveillance of the sugar works and the plantation's enslaved reinforcing the social hierarchy and control of the resident planter. The archaeology of Little Bay, bounded by context and historical contingency, provides a means to tease out the situational aspects of white Creole masculinity revealing the intersectional and relational axes of whiteness and Creole social identity that problematize the hegemonic masculine narrative inscribed in the plantation landscape. Examining the planter's house, and artifacts of hospitality and dress, this paper will explore the multi-relational entanglements of masculine social discourse embedded within the Little Bay Plantation landscape.

Striker, Bridget [183] see Striker, Michael

Striker, Michael (Gray & Pape), Bridget Striker (Boone County Public Library) and Eric Jackson (Northern Kentucky University)

[183] *Documenting Association of Properties with the Underground Railroad*

Activities related to the Underground Railroad were both ephemeral and illicit. As a result, the little direct evidence that might have existed was often destroyed or hidden. How then, can the association of a property with the Underground Railroad be established, and what does it mean for a property to have integrity? Using case studies from Boone County, Kentucky, we demonstrate how the accumulation of indirect evidence can document this association and what integrity might mean for different property types such as archaeological sites, buildings, routes of travel, and river crossing locations.

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Striker, Sarah (Arizona State University)[95] *Applications of Microscopy and Thin Section Petrography in Iroquoian Ceramic Analysis*

Iroquoian ceramic analysts typically focus on decorative style, in part because this approach maximizes the amount of information that can be obtained from an assemblage in a short amount of time. Decorative attributes can be rapidly identified and recorded, and a significant literature links patterns in decorative styles to social, temporal, and cultural trends. Characteristics of ceramic fabrics including clays and tempers are rarely examined, but adding these elements to the standard Iroquoian ceramic analysis would address important unanswered questions about Iroquoian ceramic production.

I present a methodology for the efficient and cost-effective analysis of Iroquoian ceramic fabrics applicable to ceramic pots and pipes. The attributes selected and methods for recording them are developed using insights from petrographic analysis of ceramic thin sections using a polarizing microscope following Whitbread's (1989) methodology. By focusing on characteristics diagnostic of specific technological and provenance related characteristics of ceramic fabrics that are evident using a standard binocular microscope, this methodology is designed to be used and refined in conjunction with selective petrographic analysis. I test my methodology by comparing this method with thin section petrography using ceramics from three ancestral Wendat village sites located near Toronto, Ontario spanning roughly 1400–1550 C.E.

Stroh Messerole, Megan (Sanford Museum and Planetarium) and Mark Anderson (Iowa Office of the State Archaeologist)[5] *Only Soil Deep: Geophysical Contributions to an Excavation at an Oneota Village in Northwest Iowa*

Data recovery excavations were conducted during 2016–2017 at the Dixon site (13WD8) a large Oneota village located along the Little Sioux River in northwest Iowa. The University of Iowa Office of the State Archaeologist contracted Megan Stroh, archaeologist at the Sanford Museum and Planetarium, to conduct geophysical surveys before initiation of Phase III excavations. A Geoscan Research FM256 fluxgate gradiometer was employed at three different mitigation locations under both pre- and post-top soil stripped conditions. Maps created from the survey data revealed both historic and prehistoric anomalies, including numerous potential prehistoric features. Excavations showed that a high percent of anticipated prehistoric anomalies were positively identified prehistoric features. This research proved invaluable for the excavators in recognizing historic disturbance, anticipating potential prehistoric features, and estimating excavation time for those prehistoric features and the surrounding areas. This research provides an excellent example of the efficacy of gradiometer survey in the loess derived soils of northwestern Iowa.

Stromberg, Kirie (UCLA Cotsen Institute of Archaeology)[309] *Shang Soundscapes*

Shang (c. 1600–1046 BCE) elites were expert manipulators of soundscape. The intimacy of the relationship between music and authority during Bronze Age China has been well established, bronze bells having served as crucial markers of status and political prestige. Before the codification of the ritual orchestra, however, and beyond the performance of “music” per se, soundscapes were defined by factors such as climate and local ecological context, by animals, by the noise of human activity at large. As early as the Shang, soundscape was a defining component of the Chinese habitus, evidenced by the prevalence of birds imagery in ornamentation as well as the rich array of noisemakers. This paper argues that Shang elites—and particularly ritual experts—wielded knowledge of local auditory contexts and utilized noisemakers such as rattles and jades in order to mediate between man, nature, and the ancestors. The resolution of natural cacophony through the orchestration of soundscape is an integral part of social evolution, or if one prefers, urban planning. Exploring Shang soundscapes is an opportunity to bridge scientific and humanistic approaches by combining analysis of the ecological record as well as man-made objects.

Stroth, Luke (University of California, San Diego), Rebekah Truhan (University of Iowa) and Jacob Foubert (University of Iowa)[89] *A Change of Hearth: Stages of Production in Hot-Rock Technology at a Late Woodland Rockshelter*

This paper applies the chaîne opératoire analytical framework to hearth maintenance behavior. There are distinct phases of production involved in creating and maintaining a hearth, as new hearthstones are introduced, exhausted, and discarded. These stages may be identified through spatial distribution of new and exhausted hearthstones. The authors argue that these stages may also be identified geochemically. We use pXRF to compare a series of experimental burnings to those from a hearth feature from the Late Woodland component of a multicomponent rockshelter. Group membership analysis had some success in distinguishing between stages of burning. When combined with spatial analysis, the distribution of new and exhausted rocks supported our hypothesis that the northern periphery of the hearth was disturbed by a previous excavation and distributed in its backdirt atop the original hearth feature.

Stroth, Luke [299] see Otto, Raquel

Stuart, David (The University of Texas at Austin) and Marc Zender (Tulane University)[337] *Epigraphy and History at La Corona*

The ancient Maya ruins of La Corona (ancient Saknikte') has an unusually large textual and historical record. The site's inscriptions, despite their highly fragmented and incomplete state, present epigraphers and archaeologists with a detailed account of a royal family that ruled there at least from the 6th to 8th centuries. Excavations in the last several years have revealed many more inscribed sculptures. This paper will focus on the distinctive characteristics of La Corona as a literate community of the Classic period, highlighting aspects of dynastic history, ritual subject matter, textual presentation, and language, all of which provide important cultural and political contexts for understanding La Corona in the wider world of the lowland Classic Maya. More broadly, we discuss the continuing emergence of a historical methodology in the theory and practice of Maya archaeology.

Stubbs, John (Peabody Museum, Harvard University)[291] *Discoveries on Campus: Archaeology in Harvard Yard*

While many may immediately associate Stephen Williams with his work and interest in the prehistory of the Lower Mississippi Valley, the historic period also caught his attention. His interests ranged from historic aboriginal groups of North America to a variety of topics and periods within historical archaeology. Williams had a notable enthusiasm and concern for the archaeology of the immediate Cambridge area and was often a first point of contact when it came to local discoveries. He took particular interest in artifacts originating from the Harvard campus and was instrumental in advocating for and establishing systematic excavations within Harvard Yard. The excavations, begun in earnest in 1986, still continue today and serve to introduce a wide range of students to the excitement of archaeological field work while advancing our understanding of Harvard's past. In addition to providing a glimpse of student and campus life through the centuries, the Harvard Yard excavations continue to yield valuable information about the location and construction of early college buildings. This paper highlights some of those discoveries.

Stull, Scott (SUNY Cortland)[89] *Experimental Archaeology of Medieval Food as Participant Observation*

Central to anthropology is the concept of participant observation, where a researcher engages in immersive learning through ethnographic fieldwork. This concept is also important for archaeologists as immersive learning provides an avenue for more robust interpretation and the development of better research questions. Participant observation is not directly possible in the study of medieval archaeology, but replication studies of food culture can serve as one avenue toward immersive learning in archaeology. Replication studies of medieval food, notably the use of medieval cookbooks and

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replicated medieval vessels, offer insights into medieval life and everyday practice. This paper will discuss the replication and use of both cooking vessels and tableware as part of the process of immersive learning.

Sturm, Camilla (University of Pittsburgh)

[246] *Moderator*

[246] *Discussant*

Sturm, Jennie (University of New Mexico)

[286] *Making Quality Interpretations in the Ever-Expanding World of Digital Data*

Digital data collection is often efficient, cost-effective, and a tremendous accompaniment to other archaeological collection methods like excavation. Furthermore, digital data can be used to generate measurements that are simply not possible with analog data. However, as computing technology continues to become faster, more powerful, and cheaper, and the ease of collecting massive amounts of data increases, it is fair to ask: Are our abilities to analyze and interpret these data keeping up? This paper addresses this question at a time in archaeology when digital methods are more accessible than ever, and where processing data requires little more than the push of a button to run “black box” functions without really understanding the theory behind it. In turn, the interpretation of such data often takes a back seat and little is ultimately added to the anthropological understanding of a site. By refocusing efforts to use digital data the way analog data was once used (i.e., intentionally applied with full knowledge of the method and theory behind such data), archaeologists will be in a better position to use digital data that supports efficient and well-informed research.

[235] *Discussant*

Sturt, Fraser and Duncan Garrow (University of Reading)

[113] *Real and Imagined Islands: Wet Ontologies in the Neolithic of North Western Europe*

Researchers across the breadth of academia, from oceanographers to political scientists and archaeologists, have all begun to redress the critique of ‘sea-blindness’ leveled at modern society in recent years. The result has been a re-positioning of activity on the water within our accounts of human lives and thought processes—add water and stir. The results have been inspirational, controversial, and at times utterly inoperable beyond the broadest of heuristic devices, when it comes to relating them to prehistory and the questions we have as archaeologists.

In this paper we take a different tack, building an approach to both land and water that is rooted in human activity archaeological data and the imagination. Recent results from work on the land and water of the Western seaways of North-west Europe will be used to re-evaluate how we approach space, place and narrative within the context of the Neolithic.

For context: <https://www.youtube.com/watch?v=HnQ2Lk20n3U>

Styles, Bonnie (Director Emeritus, Illinois State Museum)

[90] *Discussant*

Suarez, Amanda (University of Pittsburgh)

[260] *Pre-Columbian Conflict and Early Social Complexity in Java, Southern Costa Rica*

Based on the Spanish chronicles from the Contact period (Sixteenth century), we know that the inhabitants of what is now Southern Costa Rica were in constant violent conflict, at least during the last pre-Columbian years. On the other side, warriors, captives and trophy heads are a recurrent theme in the sculptures and other artistic representations from this archaeological area. Although the importance of warfare and conflict during the pre-Columbian period has been considered in archaeological investigations in this zone, it has been always as a side topic or only a potential explanation. In this context, the site Java presents an excellent opportunity to explore the relation between warfare and the emergence of inequality. Its topographic characteristics, size and material remains indicate that it might be one of the communities engaged in conflict that the Spaniards found upon their arrival to this region. This research will evaluate the role that warfare might have played in the social dynamics at Java, by looking at indications of the relevance of conflict and social differentiation through time.

Suárez, Rafael [2] see Okumura, Mercedes

Subiaul, Francys [227] see Ranhorn, Kathryn

Sucec, Rosemary (Intermountain Region—National Park Service)

[72] *Working at Our Edges: Managing Traditional Cultural Properties in the Desert Southwest*

The most challenging work begins with federal management of these “historic properties.” The term belies that TCPs are managed not only for their physical integrity, but for their intangible, associative values vital to maintaining the contemporary identities of indigenous and other traditional communities. Consequently, rather than merely relying on determinations by agency professionals of issues related to boundaries, integrity, adverse/cumulative effects and mitigation, it becomes imperative that TCP management involve routine consultation and collaboration within the context of agency control of that federal landscape. TCP management also challenges our assumptions about what constitutes “cultural” versus “natural,” and our tacit struggle to search for scientific truth or validity within the context of religion. Overlaying and further challenging TCP management are the economic and political interests of diverse stakeholders related to the physical location of the TCP. Illustrative examples include the Colorado River Corridor below Glen Canyon Dam; Rainbow Bridge National Monument; and the Hole-in-the-Rock Trail in Southeast Utah. The power of anthropological research in facilitating understanding is discussed, along with ideas for constructive resolutions that allow for the accommodation by and human rights of indigenous and other traditional communities.

Sugandhi, Namita [121] see Raczek, Teresa

Sugiyama, Nawa (George Mason University)

[293] *Methods of LiDAR Mapping in Urban Landscapes: Introducing the Teotihuacan LiDAR Map*

In the 1970s, systematic and expansive survey techniques enabled Million to create the first map of Teotihuacan, establishing the limits and density of the city. In this presentation we introduce a newly developed 2.5 dimensional map based on a LiDAR landscape model overlaid with a high-precision architectural map of the city drawn in AutoCAD covering 174 km² area that extends the Million map by 131 km². LiDAR technologies have greatly aided archaeological research in many landscapes with high vegetation cover by revealing ground surface detail at a quality and precision which would be difficult and highly costly to achieve with traditional ground-based survey techniques. We evaluate the perils and unique approaches to LiDAR mapping of the Teotihuacan Valley caused by both the continuous occupation and the highly urbanized landscape distinctly characteristic of the region. While this palimpsest landscape provides additional hurdles to LiDAR interpretation, it facilitates a hybrid LiDAR methodology of ground-truthing and digitizing through a fully online system.

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[293] *Chair*

Sugiyama, Nawa [293] see Fash, William

Sugrañes, Nuria and Gustavo Neme (IANIGLA-CONICET. Grupo vinculado San Rafael)[265] *Ceramic Diversity in Hunter-Gatherers Societies from Atuel River Basin, Argentina*

Hunter-Gatherers from Southern Mendoza started to use ceramic at 2000 years BP, and it starts to diversify rapidly in each environment. Such diversity shows a contrast between highlands and lowlands typologies. According to Lagiglia, this ceramic diversity was motivated for exchange between agricultural communities from western side of Andes and northern Mendoza.

In this poster, we present new ceramic information from six archaeological sites located in the Atuel river basin. This information combines distributional, technological and, neutron activation analysis, which's sustain that local types, as Overo/Nihuil, Atuel/Arbolito and Atuel Cepillado, are more homogenous than was previously proposed. The observed ceramic diversity only increase ca. 1000 years BP with the introduction of foreign types as Lolloe, Aconcagua, Viluco and Agrelo types, but in a lower quantities. Finally, the lowlands assemblages are more diverse than those located in the highlands.

Sulca Huarcaya, Nils [333] see Aguilar Diaz, Miguel

Sullivan, Elaine (UC Santa Cruz)[320] *Moderator***Sullivan, Kelsey (University of Oregon), Britton L. Shepardson (Northern Arizona University), Mario Tuki (Museo Antropológico Padre Sebastián Englert), Paula Valenzuela Contreras (Museo Antropológico Padre Sebastián Englert) and Francisco Torres Hochstetter (Museo Antropológico Padre Sebastián Englert)**[101] *Education, Conservation, and Research on Easter Island through Three-Dimensional Photogrammetry*

For fifteen years, Terevaka Archaeological Outreach (TAO) has provided local students from Rapa Nui (Easter Island, Chile) with hands-on experience to: (1) offer experiential learning opportunities about the local cultural and natural resources; (2) promote awareness and expertise in conservation measures and sustainable development; and (3) document and study the modern and ancient natural and cultural resources of the island. Three-dimensional ortho-corrected photogrammetry (3D OCP) is a valuable technology within archaeology, which is relatively cheap and accessible. Digital and physical models produced through 3D OCP serve as powerful educational tools, making cultural heritage more accessible to a range of interested parties, especially the local community.

Students who participated in the 2016 and 2017 TAO seasons photographed hundreds of artifacts at the island's only museum (Museo Antropológico Padre Sebastián Englert), as well as archaeological features and sites located across the landscape. TAO students are now using 3D OCP to create a collection of digital and physical 3D replicas on the island—for educational, conservation, and research purposes—accessible to the local community members, the tourism industry, and archaeologists. This research conveys the potential for archaeologists to help empower local communities, as well as enhance archaeological research potential through non-destruction, cutting-edge technology.

Sullivan, Lauren (University of Massachusetts), David Hyde (Western State University of Colorado), Robin Robertson (CATS, The University of Texas at Austin), Palma Buttles (Carnegie Mellon University, SEI) and Fred Valdez (The University of Texas at Austin)[243] *Material Culture and Chronology at Colha, Belize: Recent Findings and Future Directions*

Lithics, ceramics, and other artifacts, recovered from the 2017 Colha, Belize field season, are utilized to gain insight into chronological developments and changes at the ancient Maya site. Maya material culture recovered from excavations at Colha are presented and interpreted by context. Each artifact category is briefly defined, described, and placed into a general site context. The estimated time range for the recovered material culture extends from the Late Archaic to the Late Preclassic. While findings may be preliminary for several artifact classes, the current interpretations allow for useful and comparative research needs.

Sullivan, Lynne (University of Tennessee) and Kevin Smith (Middle Tennessee State University)[119] *Heading for the Hills: The Middle Cumberland Region to Upper Tennessee Valley Migration*

By 1300 CE, the people of the Middle Cumberland region were on the move, a migration related at least in part to climatic instability including multiple drought episodes. Numerous types of evidence suggest that some of these migrants went to East Tennessee. We discuss possible material culture evidence for this migration from several East Tennessee sites, but with an emphasis on the Long Island site, now located in the Tennessee Valley Authority's Watts Bar reservoir and near the base of the Cumberland Plateau. Excavations at the site by the Smithsonian in the late nineteenth century recovered a Middle Cumberland-style statue from a platform mound. Excavations in 1941, by Works Progress Administration crews supervised by University of Tennessee archaeologists, recovered pottery samples with some Middle Cumberland characteristics from three platform mounds and a large wall-trench structure near these mounds. Our study of the statue, pottery, and related artifacts and features from Long Island provides insights to the nature of the Middle Cumberland influence at this site and potentially at other sites in the region.

Sullivan, Lynne [286] see Lowry, Sarah

Sullivan, Vanessa[239] *Sinking into the Maritime Archaeology of the Ocean State: The Use of GIS to Analyze Rhode Island's Submerged Archaeological Sensitivity*

GIS has become a widely utilized tool for analyzing archaeological sensitivity. The state of Rhode Island has more documented shipwrecks per square mile than any other, making it an ideal place to develop an archaeological sensitivity model for submerged sites. In 2008, the Beavertail Lighthouse Museum Association started compiling a shipwreck database. The Rhode Island Historical Preservation and Heritage Commission has incorporated the database findings, documented submerged archaeological sites, and other data-sets into GIS so that information can be analyzed in a spatial manner.

Over 1,000 shipwrecks have been identified as a "total loss" and may prove to have archaeological remains present. More than 650 other documented wrecking events do not have enough information to determine if remains are likely, but with further research may prove significant. Integration of GIS data with the known shipwreck sites aims to advance knowledge of the Rhode Island submerged maritime landscape, which will ultimately assist in mitigation efforts during future development undertakings. This project investigates both the advantages and limitations of utilizing an archaeological sensitivity model for submerged cultural materials, and questions the opportunities and restrictions of a GIS based approach for analyzing shipwreck sites.

Sullivan III, Alan P. [153] see Sparks-Stokes, Dominique

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Rachel Summers, Meradeth Snow, Joshua Sackett and Duane Moser

[97] *Microbial Communities from Soil and Coprolites*

With implications involving health, nutrition, and even behavior, research into the human microbiome is a burgeoning field within the biological sciences. Less well understood is whether humans, both modern and past, share(d) a recognizable core microbiome. Archaeological materials represent a window into microbiome structure and function of ancient peoples. Assuming microorganisms or their DNA persist for many years under optimal conditions, coprolites should represent time capsules into the distal gut microbiome of ancient people; potentially providing information concerning subsistence practices and health. A vital step towards understanding how such information presents in the archaeological record would be the capacity to recognize and differentiate ancient microbiome constituents against potential contaminants, especially from soil. To test this, we performed parallel microbial 16S rRNA gene surveys using DNA extracted from co-located cave soil and coprolite samples. To verify that microbial DNA is distinct between the two sample types, principal coordinate analysis was applied to rRNA gene libraries from both. Microbial genera associated with modern humans were also tracked. Differentiation of coprolite microbial communities from those of native soil will increase our confidence that detected microbial communities are indeed derived from ancient peoples; an approach that will be applicable to other locales.

Summons, Roger [126] see Sistiaga, Ainara

Sun, Guoping (Zhejiang Provincial Institute of Archaeology, China)

[284] *The Source of the Hemudu Culture and Environmental Change during the Early-Middle Holocene: New Evidence from the Jingtoushan Site, Yuyao, East China*

The source of the Hemudu Culture has remained a key issue for more than 40 years. Recently, the coring survey at the Jingtoushan site has provided a chance to promote our understanding of this issue. Its cultural deposits are deeper than those of any other prehistoric site along the coastline of East China. It is overlain by Late Holocene marine deposits of 6 meters deep. Twenty radiocarbon dates, along with the particular depth of midden deposits and pottery sherds, indicate that the site dates to 8,000 BP, much earlier than most shell middens that have been uncovered in China. It is considered to be related to the source of the Hemudu Culture. The preservation and richness of organic materials are extraordinary. This site has great potential for understanding environment changes and sea level rise in the coastal area of East China since 10,000 years ago, as well as the interactions between human societies and environment.

Sun, Yufeng (Washington University in St. Louis)

[336] *Crop Processing in the Lower Yellow River Valley: From Known to Unknown*

As one of the most highly-developed cultural regions in China, many aspects of the lower Yellow River Valley have been systematically studied, including climatic revolutions, cultural patterns, and subsistence strategies, among others. It is now known that the diversified environments of the Valley, including flood plains, hills and coastal regions, facilitated the development of distinctive cultures and subsistence patterns in these areas. These distinctions are principally reflected in their production and processing of crops. In this paper, I will provide an overview of precedent-setting paleoethnobotanical studies in the Valley, and then place them into a framework of climatic and settlement pattern revolution. By analyzing the food structure, spatial distribution of crops, and the ways groups harvested and processed food, I will put forward a model of crop processing in the prehistoric Yellow River Valley, which may then provide a pathway to understand human adaptations and social complexity in this context.

Sunell, Scott (UCLA)

[186] *Cultural Dimensions of Toolstone Variability in the Santa Barbara Channel Region, California*

The Santa Barbara Channel region of southern California lacks reliable sources of high quality toolstone except in a few prominent locations. The nearest obsidian sources are hundreds of miles away, and local chert can be highly variable in quality and availability. Monterey chert, common to both the northern Channel Islands and the adjacent mainland, varies widely in terms of inclusions, color, and consistency; Franciscan chert from the mainland is similarly troublesome for tool-makers on a large scale. In spite of this, the Chumash and their ancestors utilized these materials for more than 10 millennia to manufacture finely worked bifaces; late in prehistory they also developed sophisticated specialized microlithic tools for shell bead production. Most research in the region has focused on these craft products while omitting the critical role played by widely available but poor quality toolstone. I evaluate the use of low quality local materials in this context, arguing that patterns of lithic production on Santa Cruz Island responded more strongly to cultural norms than to the functional properties of specific toolstones. While the intrinsic properties of given materials may have set the stage for later innovations, by the first millennium AD chert was more than just good stone.

Super, Clare, Meradeth Snow (University of Montana), Anna Prentiss (University of Montana), Ethan Ryan (University of Montana) and Nathan Goodale (Hamilton College)

[97] *Ancient DNA Analysis from Micro-fractures in Bridge River Stone Tools*

There has been little research specifically designed to examine variability in how the porosity of lithic raw materials and micro-fractures from use-wear create environments that trap and preserve residues containing DNA on lithic tools. This study examines lithic tools made from a variety of raw materials to assess the effects of variability of raw material type, use-wear, and damage on preservation of ancient DNA (aDNA). aDNA analysis of stone tools can begin to address if the tools were used to process specific species of animals. The ancient lithics used in the study were from the Bridge River Excavation site in the Middle Fraser Canyon, British Columbia. The site was occupied periodically from 1800 years ago to the mid-19th century (Prentiss et al. 2008). The protocol to extract and amplify aDNA locked in micro-cracks on the surface of tools involved treating them with chemicals and sonication (Shanks et al. 2005). Bridge River researchers have designated the tools as used in "food processing or tool manufacturing" (Prentiss 2014), and our analyses had potential to connect the tools with specific species such as elk or deer (as well as *Puma concolor*, and *Canis lupus familiaris*), and provide an interesting new avenue of investigation.

Supernant, Kisha (University of Alberta, Department of Anthropology)

[205] *Heritage, Healing, and Coming Home: An Archaeologist Encounters Her Ancestors*

Archaeologists in the Americas rarely study their own history; rather, the bulk of archaeology in this region is done on Indigenous histories. Non-Indigenous archaeologists studying Indigenous history can contribute to the erasure of Indigenous peoples from the accounting of their own past by centering the scientific study of material culture as the best or only way of knowing the truth. So what happens when an Indigenous archaeologist encounters her own ancestors in the archaeological record? In this paper, I explore how archaeology and cultural heritage help me to face and heal the intergenerational trauma of my Métis family, both on a personal and community level. The history of the Métis Nation in Canada has rarely been examined in the archaeological record and, for many decades, Canada attempted to erase Métis identity. In light of Métis resurgence, I argue for the important role archaeology can play in helping us reclaim our rights and recognition. In this context, archaeology can fill in the silences and erasures of history, bringing disconnected Métis people home to their heritage in tangible ways.

[235] *Discussant*

[205] *Chair*

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Supernant, Kisha [120] see Ives, John W.

Surface-Evans, Sarah (Central Michigan University)

[205] *Traumascapas: Progress and the Erasure of the Past*

Urban landscapes, those densely populated spaces in which generations of people live, play, work, and die, are complex palimpsest of memories. But not all memories are treated the same or are even chosen to be remembered. My own experiences as an archaeologist living in a modest-sized, rust-belt city for nearly two decades has exposed the never-ending rush of “progress” to erase the past. At both my research sites and my home, I see communities harmed by the trauma of forced erasure of the past—forced forgetting. As landmarks, parks, homesteads, and factories that were once the backdrop of many people’s lives are destroyed, communities experience the disorientation and dislocation of memory. The demolition of the past is usually coated with a veneer of newness and the promise of better times ahead. But what trauma becomes embedded in the landscape once communities lose their physical connection to their past and their identities? What burdens are placed on those who are left to do the work of remembering? I propose that “traumascapas” are created in the violence of gentrification. Heritage practitioners interested in social justice must consider the traumatic effects of uncritical economic development.

[205] *Chair*

Surmely, Frédéric [41] see Franklin, Jay

Surovell, Todd (University of Wyoming), Matthew O’Brien (California State University, Chico) and Randy Haas (University of California, Davis)

[124] *Gender and Space in Campsites of Dukha Reindeer Herders*

The division of labor by sex and gender among small-scale societies is well known, but how differences in gender roles are reflected in variation in human spatial behavior has received considerably less attention. Understanding how and why individuals of different gender use space is critical to the development of middle range theory linking gendered human behavior to its archaeological correlates. Over five field seasons, we have collected data on the spatial distribution of people and activities within the interior and exterior spaces of campsites of nomadic Dukha reindeer herders in Khövsgöl Province, Mongolia. In all, our sample includes more than 20,000 high precision spatial data points collected by observational mapping and photogrammetry. In this paper, we examine how cultural models, division of labor, and other factors structure the distributions of male and female activities in Dukha camps. We end with a discussion of the relevance of our findings for archaeological gender studies.

Surovell, Todd [124] see Haas, Randy

Sutherland, Kenneth (Louisiana State University) and David Chicoine (Louisiana State University)

[265] *Volumetric Analysis of Neckless Jars and Bottles in Early Horizon Nepeña, Peru*

This contribution explores feasting practices discernible from the pottery assemblage at three Early Horizon archaeological complexes in the lower Nepeña Valley, north-central coast of Peru: Caylán (800—1 BCE), a large town or city interpreted as the primary center of a multi-tiered polity; Samanco (500—1 BCE), a small coastal town involved in production and exchange of maritime resources; and Huambacho (600—200 BCE), a ceremonial center associated with agricultural production. In feasting related studies, archaeologists tend to focus on qualitative issues while quantitative issues remain understudied. Questions regarding how much beer was brewed, how much stew was served, and the relative scales of food preparation within family and household contexts compared to public feasting contexts need to be addressed. This poster reviews ceramic assemblages from different compounds at Caylán, Huambacho, and Samanco, comparing vessels used for production and consumption of foods and beverages in both public and residential areas. Particular attention is given to bottles as consumption vessels and to ollas sin cuello, or neckless jars, as production vessels. Variations in the volumetric capacities of vessels between compounds within a site and between compounds at different sites enlighten on the sociopolitical importance of feasting events.

Sutter, Richard (Indiana University-Purdue University Fort Wayne)

[249] *Variability among the Dead: Population Structure and Inferred Cultural Adaptations to the Changing Environmental and Sociopolitical Landscapes during the Late Moche (AD 650–800) Era in the Jequetepeque Valley, Peru*

Recent bioarchaeological and archaeological research regarding the environmentally influenced demise of the Moche (AD 200—800) of the Jequetepeque Valley, Perú, indicates a variety of responses, including population dispersals, political fragmentation, cultural hybridization, and new political alliances with recently arrived foreigners at ceremonial centers. Biodistance analyses suggest that adjacent highland Cajamarca peoples from the adjacent highlands arrived in the Jequetepeque and likely interbred with local inhabitants interred at San José de Moro during both the Late Moche (~AD 650–800) and subsequent Transitional (~AD 800–900) periods. Local ceramicists at San José de Moro responded by experimenting with hybrid vessels that blended both local Moche forms and designs with new ones brought by highland immigrants in a process that Kolata has referred to as orthopraxy. These data speak to social and political relationships that existed between the arrival of foreign Cajamarca and local Moche during this period of dramatic change.

Sutton, Wendy (USDA Forest Service, Gila NF)

[106] *The Gila Wilderness: Defining, Redefining, and Managing Our First Wilderness Area*

In 1924 the Gila Wilderness was established. Ideas of what wilderness is have changed since then, particularly with the passage of the Wilderness Act in 1964. On the Gila National Forest these changes are reflected in changing wilderness boundaries and management strategies. Wilderness boundaries were re-drawn to exclude man-made features, some constructed by the CCC after designation. Historic and prehistoric sites associated with the wilderness, both within and immediately outside of it (and their management through time), are physical manifestations of the national dialogue about what wilderness means to us.

Suyuc-Ley, Edgar [252] see Hansen, Richard

Suyuc-Ley, Edgar [18] see Thornton, Erin

Suzuki, Shintaro [306] see Hannigan, Elizabeth

Swain, Emily

[251] *Hidden beneath the Asphalt: Urban Archaeology in Parking Lots*

Historic maps provide tangible visual evidence of how cities evolve over time. Buildings are erected and demolished, roads are constructed, and streams are diverted or filled. To an untrained eye, the built environment of a typical city block may look like an unlikely place to find archaeological remains but to an archaeologist it is a time capsule waiting to be opened. To this end, urban archaeology often requires peeking beneath parking lots, which often provide temporary protection to buried resources until the land is slated for development. The changing dynamics of an evolving city may

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mean that beneath the parking lot archaeological resources are buried beneath extensive fill deposits. Conversely, they may have been destroyed by extensive grading. Consulting historic maps, conducting elevation change analyses, and conducting geophysical testing can provide an idea of what is buried below, but ultimately excavation is required to determine what survives. This paper will discuss several urban archaeological sites found beneath parking lots in DC, Maryland, and Virginia.

[251] *Chair*

Swain, Emily [251] see Knight-Iske, Geri

Swanston, Treena [208] see Varney, Tamara

Swantek, Laura (Arizona State University)

[146] *Reconfiguring Social Networks: The Emergence of Social Complexity before and after Urbanism on Cyprus*

Despite the lack of cities, the Prehistoric Bronze Age on Cyprus (2400–1700 cal BC), an island in the Eastern Mediterranean, witnesses high wealth inequality and spatiotemporal variation in the emergence of social complexity or hierarchical social networks. Previous research has shown that social networks are malleable and cycle between egalitarian and hierarchical in different facets of complexity (control of labor, access to resources, participation in trade networks) through the Prehistoric Bronze Age as social actors renegotiate their social and economic worlds. What remains unknown is whether cycling social networks are a phenomenon present only in pre-urban societies or if this social malleability continues after urbanization. To compare these processes, methods derived from small world network analysis and modern economics are used to explore the changes in and stability of social networks and wealth inequality as cities first emerge on Cyprus during the Protohistoric Bronze Age (1700–1200 cal BC).

Sweeney, Alex (Brockington & Associates), Kara Bridgman Sweeney (Brockington & Associates), Naoki Higa (Higa Archaeological Research Office, Inc.), Takumi Kishimoto (Palyno Survey, Inc.) and Naho Ishiki (Environmental Science Corporation)

[24] *Sustainability and Tradition in Anindo Village, Okinawa, Japan*

A recent collaborative effort by Japanese and American archaeologists and environmental scientists identified and examined the historic (ca. 1897-late 1950s) Anindo Village. Located within the stream valleys and mountainous uplands of the Kanna Watershed in central Okinawa, Japan, Anindo Village was a short-lived reclaimed land settlement dependent on both agricultural and forestry-based economic practices. This paper examines the distribution of archaeological sites and the natural and cultural landscapes related to this historic settlement. Ethnographic research with descendant communities enhanced our interpretation of cultural practices in Kindai Period (AD 1879–1945) settlements. Our investigations provide a context to a wide variety of sites, including household and farmstead remains, agricultural farming fields and complexes, habitation terraces, a cemetery and tombs, and World War II evacuation tunnel shelters. Charcoal kilns, used by the villagers for supplemental income, were also identified throughout many of the surrounding stream valleys. Ethnobotanical analysis in the environs of Anindo Village indicates intensive arboriculture, as well as the cultivation of non-arboreal plants. In addition, traditional cultural practices demonstrated at the Anindo Village sites reflect an ethos of sustainability in line with official Imperial Japan directives as well as local (prefectural) forestry society guidelines.

Swenson, Edward (University of Toronto)

[216] *Gender Complementarities and the Construction of Late Moche Political Landscapes*

Recent investigations at the Late Moche center of Huaca Colorado in the southern Jequetepeque Valleys suggests that gender complementarity constituted an overarching structuring principle that underwrote Late Moche conceptions of ecology, cosmos, political authority, and the power of sacred places. The dualistic layout of the huaca's ceremonial nucleus resonates with general Andean philosophies that moral order was founded on the balanced if dialectical interdependence of male and female forces. However, an investigation of the ritual practices of the center along with the spatial differentiation of gender-specific activities within the larger site reveals some of the distinguishing features of Late Moche ideologies of sex and complementarity. Ideals of male, female, and their union (yanatin) were spatially inscribed and appear to have formed the common denominator of a whole series of complementary oppositions, including production and consumption, life and death, senior and junior, day and night, highland and lowlands, and possibly sky and earth. In the end, the data suggest that gender identity was not so much determined by biological sex but by the activities and rituals performed by cooperating groups at Huaca Colorado.

Swift, Jillian (Max Planck Institute for the Science of Human History)

[125] *Getting to Know the Neighbors: Commensal Insights into Human-Ecosystem Dynamics*

Advances in zooarchaeological method and theory, increased attention to the recovery and analysis of microfaunal remains, and multidisciplinary collaborative research have generated increasingly nuanced understandings of past human-animal relationships. This paper provides a brief introduction to archaeological investigations of commensal fauna, highlighting the myriad ways that research focused on the commensal niche sheds new light on past societies and ecosystems. A case study from Makangale Cave (Pango la kijiji Makangale), Pemba Island, Zanzibar illustrates the utility of small commensal fauna for understanding processes of human niche construction and paleoecological transformations. Stable carbon and nitrogen isotope data derived from the human-transported, omnivorous black rat (*Rattus rattus*) and house mouse (*Mus musculus*) reflect changes in nutrient flows throughout anthropogenic food webs, as well as resource partitioning between two species occupying the human niche. Explicit focus on these often-ignored commensal taxa provides new tools for investigating human-environment dynamics in the past.

[125] *Chair*

Swift, Jillian [9] see Maline, Sophia

Swisher, Christopher (Indiana University of Pennsylvania) and Jonathan Burns (Juniata College)

[334] *Investigations at the James Hatch Site and the Houserville Archaeological National Register District, Centre County, Pennsylvania: The Benefits of Collaboration between Institutes of Higher Learning and Government Agencies*

In 2017, the coupling of a Federally funded transportation project with an undergraduate archaeological field school, and Applied Archaeology thesis research, produced an innovative approach to archaeological mitigation. The project funded a Phase III investigation of a lithic workshop site—the James W. Hatch Site. The site was occupied during the Early Archaic Period, and attracted occupations focused on jasper reduction at a location 1.2 kilometers from a quarry. The site produced over 9,000 prehistoric artifacts from contiguous block excavation. Another part of the federally funded project included the synthesis of survey data from sites surrounding the jasper quarry, and helped re-evaluate and map the boundaries of the Houserville National Register Archaeological District. The reevaluation of the district will help guide the management of sites affected by future infrastructure projects for many years to come. This project serves as an example of an innovative and cost-effective alternative mitigation solution providing valuable experiential learning opportunities to students and young professionals while effectively managing cultural resources.

Swisher, Kimberly [266] see Coker, Adam

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Swogger, John (Archaeological Illustrator)**[108]** *Genuine Reproductions: Ethics, Practicalities and Problems in Creating a Replica of a Zemi from Carriacou*

When is a copy not a fake?

In 2014, the Carriacou Archaeology Project (University of Oregon; University of London) excavated a unique stone zemi at the Grand Bay site on the island of Carriacou, Grenada. The decision was made to create casts of the zemi in order to facilitate simultaneous display of the object in multiple island museums. It was hoped this would allow both museums to advocate the small island of Carriacou as a site of particular archaeological significance, to stimulate scientific tourism and promote the research potential of the island to post-graduates.

However, the making of the casts has raised some potentially problematic issues. The original intention was that the museums would display the casts correctly labelled as copies. This has not happened, raising the question as to whether or not the casts are moving from being mere “replicas” to being fakes: copies which deceive—however unintentionally or benignly. And because the casts increase the “visibility” of the original they are adding new layers of economic and aesthetic value to the original—with potential implications for theft, forgery and looting.

Swope, Karen K. [261] see Barnes, James

Sykes, Naomi (University of Nottingham), Greger Larson (University of Oxford), Carly Ameen (University of Liverpool), Philip Shaw (University of Leicester) and Tom Fowler (University of Nottingham)**[217]** *The Easter E.g.—Changing Perceptions of Cultural and Biological “Aliens”*

Human immigration and biological invasions are high-profile topics in modern politics but neither are modern phenomena. Migrations of people, animals and ideas were widespread in antiquity and these are frequently incorporated into expressions of cultural identity. However, the more recent the migrations, the more negative modern attitudes are towards them. In general, native is perceived as positive and ‘natural’, whereas the term ‘alien’ is attached negatively to cultural and environmental problems. This paper will explore these value-judgements through the example of Easter, the most important event in the Christian calendar.

The Easter festival and its associated animals—namely the brown hare, rabbit and chicken—are all ‘alien’ to most of the areas in where Easter is celebrated. This paper will focus on the integrated use of scientific approaches (genetics, GMM and isotopes) with evidence from traditional (zoo)archaeology, art history, and historical linguistics to investigate the human-mediated dispersal of the brown hare and rabbit in connection with the Easter cult. It will argue that the cultural and temporal context of these ‘alien’ introductions are key factors for both understanding the origins of Easter and challenging widespread negative attitudes towards cultural and biological ‘aliens’.

Synsteliën, Jennifer (University of Tennessee, Chattanooga) and Heli Maijanen (University of Oulu)**[90]** *Bone Modification by the American Cockroach*

Bone modifications by chewing insects and their larvae have been described for several families. We report extensive bone damage due to feeding of the American cockroach (*Periplaneta americana*), a close relative of termites. Roaches were seen feeding on thawing vertebrate remains in a processing room, in which skeletons were being prepared for entry into a comparative collection. A study of roach gnawing was initiated after a number of defleshed mammal bones were discovered extensively modified. Six human skeletons that were similarly processed in a neighboring suite were also surveyed for insect damage. Gnaw marks were examined under a stereomicroscope using 10–40x magnification. A feeding experiment with housed roaches demonstrated this insect’s ability to modify bone. Locations of extensive roach feeding appeared superficially similar to small rodent gnawing, but the two agents were clearly separable under low magnification. Roach mandibular scrapings and their patterns were similar to those previously reported for termites. This study shows the widely distributed American cockroach can and will modify thin cortical bone and underlying trabeculae; and suggests this highly omnivorous species favors soft tissue and bone lipids. Significantly, roaches are potential agents of bone modification of vertebrate carcasses that decay in subaerial or shallow burials.

Szabo, Vicki [16] see Frasier, Brenna

Szapak, Paul (Trent University)**[50]** *The Environmental Context of the Dorset-Thule Transition: Evidence from Stable Isotope Analysis of Archaeofauna*

Stable carbon and nitrogen isotope analyses of fauna from archaeological sites in the Central Canadian Arctic Archipelago were performed to examine the environmental context of the Dorset-Thule transition. Isotopic data from a large number of ringed seals demonstrate that there was a reduction in the importance of primary production derived from sea ice-associated algae during the Thule occupation relative to the earlier Dorset occupation; these data are consistent with an increase in open water conditions at this time. Arctic foxes from Thule sites consumed significantly more marine protein than those from Late Dorset sites, which would have been obtained from scavenged marine mammals killed by humans and polar bears. This shift was most likely driven by the deposition of bowhead whale carcasses on the landscape by the Thule, which altered the foraging ecology of the Arctic fox.

[315] *Discussant***Szremski, Kasia (University of Illinois)****[65]** *Alternative Complexities in the Central Andes: An Anarchist Approach to Chancay Political Organization in the Huanangue Valley*

Understanding the political organization of Late Intermediate Period (1000–1470 CE) societies along the central coast of Peru has remained challenging. The urban/proto-urban settlements that are characteristic of groups like the Chancay, Ichma, and the Chinca (among others) have been interpreted as material manifestations of elite power, however, many of these societies don’t fit traditional models of chiefdoms or states. Using a combination of ethnohistoric data, settlement pattern analysis, and excavation data, this presentation draws from recent trends in anarchist theory to explore the applicability of “horizontal-complexity” models for some LIP Andean societies. This paper examines the case of the Chancay, who which rose to prominence on the north-central coast of Peru between 900–1532 CE. Specifically, this paper explores the relationship between two Chancay sites in the Huanangue Valley, Cerro Blanco and Salitre, to argue that the Chancay complexity may have developed out of a resource sharing system that was created as part of a local level responses to environmental challenges. As a result, the Chancay polity may be better understood as a horizontal network of loosely affiliated nodes bound together by principals of mutual aid instead of as a centrally organized chiefdom or state.

Szymanski, Ryan (Washington State University)**[290]** *Approaching Equifinality: Pollen and Non-pollen Palynomorphs as Complementary Paleoecological Proxies*

In analyses of paleoenvironmental records, the specific effects of climate/precipitation patterns and human landscape impacts on ancient ecologies can be difficult to discern. As largely substrate-specific in nature, fungal spores may serve as proxy for a range of phenomena, such as soil erosion, landscape burning, vegetation clearance, moisture availability, and the existence of particular plant types in a given area. Microbotanicals, including pollen, fungal spores, phytoliths, and microcharcoal, isolated from a 2.5 meter sediment core recovered from Kingwal Swamp in western Kenya are used here to demonstrate the value of fungal palynomorphs as environmental indicators, particularly when employed in concert with these more traditional proxy types. I illustrate how cross-checking of palynological interpretations with fungal data can be used to refine models of landscape change and increase interpretive confidence via the elimination of equifinal trajectories potentially responsible for observed archaeological and

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paleoecological data patterning. Examination of congruence, or lack thereof, between these lines of evidence can thus render past human ecological impacts more easily visible.

Tabata, Yukitsugu (Waseda University)

[175] *Techno-morphological Approach to the Stoneware Production in Angkor*

This paper will discuss several aspects of premodern stoneware industry in Cambodia. Based on the results of recent excavation of the stoneware kilns in Angkor area, traits of the kiln structure, fuel strategy, forming techniques, glazing, and loading method of the Khmer stoneware will be discussed.

Tabata, Yukitsugu [175] see Chhay, Rachna

Tabatabaeian, Shadab

[73] *Eyes in the Dark: Explaining the Universal Ritual Function of Dark Zones via Eye-tracking Technology*

A plethora of ethnographic and archaeological evidence indicates a cross-cultural association of dark zones of caves with supernatural phenomena. In various geographic locations and time periods, human beings have been frequenting dark zones for ritual purposes. Regarding the unsuitable living conditions of dark zones, the following question arises: what drives humans to choose such places for practicing rituals? The answer to this question lies in the way human beings interact with dark cave environments. In this paper, I suggest that experiencing sensory deprivation, in particular lack of vision in dark zones, precipitates the enhancement of abstract and magical thinking. To verify this hypothesis, I employed the methods of cognitive scientists—namely, experimental research. I conducted an experiment using eye-tracking glasses to record participants' eye-movement trajectories in darkness. The results indicated that eye-movement patterns during darkness resemble that of activities involving abstract and primary process thinking (aka magical thinking). Consequently, darkness provokes and facilitates magical thinking. Thus, I suggest that in addition to social and cultural incentives, darkness, as an environmental cue, sets the stage for human beings to associate dark zones of caves with supernatural powers and therefore choose to practice rituals in such locations.

Tache, Karine (CUNY Queens College) and Roland Tremblay (Ethnoscop Inc.)

[77] *A Taste for Fish among the Saint Lawrence Iroquoians of the Montreal Region*

Iroquoian groups inhabiting the Saint Lawrence valley in the 15th and early 16th centuries were agriculturalists who complemented their diet with a variety of wild plant and animal foods. The relative importance of different food sources and their methods of preparation, however, likely varied from one community to another. To further document subsistence practices and foodways at the Iroquoian site of Dawson in Montreal, organic residue analysis was carried out on foodcrust and absorbed ceramic samples representing twenty-nine distinct containers recently excavated. Molecular characterization of lipids by gas chromatography-mass spectrometry (GCMS) show the presence of aquatic products in a great majority of samples. These data attest to the importance of freshwater fish for Iroquoians of the Montreal region and represent direct evidence of their frequent processing in ceramic containers, either alone or mixed with other ingredients. By combining these results with single compound isotope analysis (GC-c-IRMS) and the analysis of starch and phytolith microfossils, we hope to obtain a more complete picture of the range of foods prepared in pottery at the Dawson site, and ultimately shed new lights into food choices and culinary practices among the Saint Lawrence Iroquoians.

Tache, Karine [225] see Lamothe, Francis

Tafari, Aurelien (University of South Florida), Andrea Vianello (University of South Florida), Robert H. Tykot (University of South Florida) and Emanuela Galdi (University of Ferrara)

[23] *Reconstructing Individual Life Histories in Early Medieval Italy through Serial Analysis and Compositional Analysis of Bones and Teeth*

This contribution aims at gaining on the life history of individuals buried in northeastern Italy between the fifth and the seventh centuries AD. Elemental analysis of human and animal remains provides data on the evolution of diet and mobility at a time of significant social changes. Our research strategy, based on a preliminary histological study on teeth and bones and on serial sampling, gives us the opportunity to observe these variations at the level of the individual. Thus, this research provides us with some new insights on the consequences of the fall of the Roman Empire by revealing the living conditions of the inhabitants of the Po Valley during the formative period of the Langobard, Venetian and Byzantine Empires of Italy.

Taft, Mara [138] see Benden, Danielle

Taivalkoski, Ariel (University at Buffalo)

[16] *Technological Choice and Human-Animal Relationships: A Bird's Eye View*

New theoretical attitudes in zooarchaeology have begun exploring the social dimensions of human-animal relationships. As representative of both human-environment and human-material interactions, the dynamics between people and animals go well beyond household economics. This paper presents preliminary results of the analysis of avian remains from the Aleutian Islands as part of a study characterizing the complex relationship between the Unangan people and birds as it changes over time. Here, technological choice is used as a method for parsing out the many contingencies, economic, social, cultural and environmental, that constituted the interactions between Unangan and birds. This approach melds materiality with the classic economic and ecological approaches in order to employ a more comprehensive perspective on the subject-hood, if not subjectivity, that birds and animals retained in Unangan culture.

Takahashi, Akatsuki

[78] *Underwater Cultural Heritage Protection and Management in Pacific Island States*

The waters of the Pacific Ocean contains a wealth of Underwater Cultural Heritage (UCH) encompassing the history of humanity from the Stone Age to the Atomic Age and witnessing climate change. This paper presents a summary of the outcomes of the UCH Programme in Pacific Small Island Developing States (SIDS). Notable progress includes the reference to the UNESCO Convention on the Protection of the UCH in SAMOA Pathway outcome document (2014), national and regional capacity building workshops, and Chuuk Lagoon Ocean Emergency Response—Safeguarding UCH, Addressing Environmental Hazards—Project (2017). Updates on the other UNESCO Conventions such as the Convention concerning the Protection of the World Cultural and Natural Heritage and the Convention for the Safeguarding of the Intangible Cultural Heritage (ICH) are also provided in order to illustrate the concept of Heritage of Humanity and explore linkages among tangible, intangible and natural heritage safeguarding. The paper concludes by discussing the prospective of the Marine Archaeology from the Pacific SIDS perspective, which aims to engage the people in the Pacific in UCH protection with an integrated and community-based approach not only for scientific research cooperation but also for achieving the Sustainable Development Goals (SDGs), reconciliation and peace.

Talaverano, Arlen [154] see Zimmer-Dauphinee, James