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ABSTRACTS OF INDIVIDUAL PRESENTATIONS

2015 Field School, NMSU [303] see Duran, Paul A.

Abarca Labra, Violeta [231] see Swift, Jaime

Abbott, Callum (Department of Anthropology, University of Victoria)

[172] *Lithics and Learning: Toward a Heart-Centered Lithic Analysis*

Both archaeologists and the knappers who created the lithics we recover are skilled practitioners implicated in a genealogy of technological practice. These living, thinking, and feeling beings make tools with their hearts and their minds—two inseparable components of the complete corporeal experience. A heart-centered approach to lithic analysis offers insights about the social and emotional contexts of situated learning in which ancient and contemporary makers of stone tools engage. The process of co-construction between the makers of material culture and the things they make means they actively shape each other across time and space. This has implications for communities of practice in the past as well as the present. Therefore, tracking the choices, movements, and gestures made along the chaînes opératoires of stone tool production positions the (re)creation of embodied knowledge within the materially, environmentally, and socially mediated world of learning and enskilment. In this paper, I explore the findings of a diachronic analysis of three lithic assemblages from Quadra Island, British Columbia and propose a methodology for conducting a heart-centered lithic analysis. I incorporate qualitative and quantitative data of the artifacts themselves, their relation to communities of tool-makers, and my own experience of learning to make stone tools.

Abbott, David [335] see Craig, Douglas

Abdollahzadeh, Aylar [40] see Leader, George

Abрамиuk, Marc (California State University Channel Islands)

[298] *Preliminary Findings at the Quebrada de Oro Ruins: Shining New Light on a Classic Maya Site We Thought We Knew*

The Quebrada de Oro Ruins comprise the remains of one of four known Classic Maya centers located in Bladen Branch region of the Maya Mountains of southern Belize. Initially recorded in the 1970s, the site has not garnered much attention by archaeologists due to its remoteness. However, this has not deterred cartographers from noting it as a significant landmark or archaeologists from asserting that it played an important role in ancient times. This contrasts with the views of the few archaeologists who have visited the site only long enough to report on the site's rather typical layout containing modest-sized structures. So what do we really know about the Quebrada de Oro Ruins? Recent investigations of the site have been launched in pursuit of an answer to this question. This paper describes the preliminary findings of these investigations and touches on what they mean for our understanding of the Quebrada de Oro Ruins and the surrounding area during the Classic period.

Abrantes, Joana [86] see Cardoso, Hugo

Abrego Rivas, Alejandra [91] see García Ferrusca, Víctor Hugo

Abtosway, Matthew

[326] *Exploring the Viability of Geochemically Sourcing Elaborate Metates through XRF Spectroscopy*

The Central American elaborate metate is a perplexing group of ground stone artifacts. Their function continues to be the subject of debate, with interpretations ranging from hallucinogenic and food preparation to ritual seating. It is difficult to deny, however, the substantial labor investment represented and likely symbolic significance. X-ray fluorescence spectroscopy has proven an invaluable tool in the nondestructive geochemical sourcing of archaeological obsidian, providing insights into exchange and the relationships between sometimes distant cultures. Less homogeneous materials, such as basalt and andesite, offer a distinct set of challenges compounded by the size of the artifacts themselves, however the possibility of illuminating the origins and mobility of ground stone merits study. The Archaeology Museum at the University of Calgary offered a unique opportunity to test and perfect a methodology to overcome these challenges prior to application in a less accommodating field environment. A selection of complete flying panel, effigy and elaborate basin metates with little to no provenience were selected for spectroscopy with a portable XRF unit. Cluster analysis was conducted with the produced spectra, as well as those recorded in the Rutgers University Central American Geochemical Database.

Abulafia, Talia (Talia Abulafia), Ofer Marder (Ben Gurion University of the Negev) and Omry Barzilai (Israel Antiquity Authority)

[338] *The Lithic Industries from Area C: Typo-Technological Characteristics*

The lithic assemblages from Area C derive from a thick section composed reworked terra rossa soil of dark brown to reddish brown, loose clay to silty clay loam with abundant biogenic and anthropogenic materials subdivided into eight units. The depositional sequence of the units is in a chronological order as shown by radiocarbon and U-Th dates (Hershkovitz et al., 2015). A typotechnological analysis of the all units suggest a shift in industries through the sequence. Unit 2–3 are small assemblage which seems to be associated with post-Aurignacian/Aurignacian industry. Unit 4 is Aurignacian as it includes typical components such as twisted bladelets, carinated/nosed end-scrapers, flat end-scrapers, dofour blades, burins and bone and antler tools, and preference for flake production. Unit 5 contains both Aurignacian and Ahmarian components. The upper part resembles unit 4. While the rest show Aurignacian characteristics and some Ahmarian as well. Unit 6 the upper part is also mixed, but the lower shows more Ahmarian elements. Unit 7 represents a homogenous unit that shows a clear preference for bladelet production. The El-wad points and its variant are very common for the Ahmarian as well as a few MP artifacts that seem to extend to Unit 8.

Abulafia, Talia [338] see Goder Goldberger, Mae

Acabado, Stephen (UCLA)**[285]** *Zones of Refuge: Resisting Conquest in the Northern Philippine Highlands through Agricultural Practice*

The origins of the extensive wet-rice terrace complex in Ifugao, Philippines have been recently dated to ca. 400 years ago. Previously thought to be at least 2,000 years old, the recent findings of the Ifugao Archaeological Project show that landscape modification for terraced wet-rice cultivation started at ca. 1600. The archaeological record implies that economic intensification and political consolidation occurred in Ifugao soon after the appearance of the Spanish empire in the northern Philippines (ca. 1575). The foremost indication of this shift is the adoption of wet-rice agriculture in the highlands, which served as zones of refuge for local populations. I argue that the subsistence shift was precipitated by political pressures and was followed by political and economic consolidation. Wet-rice agriculture was an expression of imperial resistance; it also facilitated political integration. Using paleoethnobotanical, faunal, and artifactual datasets, this paper documents the process that allowed the Ifugao to resist conquest.

Acabado, Stephen [198] see Lauer, Adam

Acebo, Nathan (Stanford University)**[98]** *Reassembling Black Star Canyon*

The Santa Ana mountain landscape of contemporary Orange County, California, has been dichotomously characterized as “a wild frontier” and “a tamed indigenous space” where the material and social histories of indigenous communities are downplayed and legacies of Spanish, Mexican and American colonial society are both solidified and continued. Within this landscape, the Black Star Canyon Village site (CA-ORA-132) objectifies this binary historicity as the site constitutes a prehistoric/historic period landmark associated with the local history of the “Battle of Black Star Canyon,” in which Native Americans were accused of stealing horses and were subsequently massacred in 1831 by American fur trappers. This paper seeks to complicate the fractured modern narrative of the site by exploring how prehistoric and colonial era materialities of the mountain afford local and nonlocal indigenous practices of social and economic subversion while challenging dominant historical accounts of extinction and indigenous passivity.

Acevedo, Agustín [62] see Franco, Nora V.

Acosta, Jocelyn [11] see Saldana, Melanie

Acosta, Marcelo (CÉLAT—LAVAL University)**[292]** *Materializing Ideas: Preliminary Analysis of Roof Tiles Images from the Nuestra Señora De Loreto I and San Ignacio Mini I Missions (1610–1631)*

In this paper we will be discussing the iconography of the roof tiles found in the primitive missions of Nuestra Señora de Loreto and San Ignacio Mini located in the region of the Guairá. The aim is to analyze the material and symbolic universe that circulated in the primitive Jesuits missions (1610–1631). In order to achieve this goal, we will first analyze the technologies of production, the iconographic types and interpret the possible meanings acquired in the representations shown on the roof tiles. So far the archaeological research prioritizes the urban organization and the materials in the missions but omits the symbolic component that gave sense to the space and to the objects. The reductions were spaces of evangelization where circulated religious messages in two directions: from the evangelists to the Guarani, and also from the Guarani to the Jesuits. To accomplish this, they used different means of communication. The analysis of the technologies and the images on the roof tiles of both reductions allows us to analyze the technical and symbolic speeches of the material culture. We finally discussed above the discourse on the roof tiles and their symbolic role in the first period of evangelization.

Acosta Alejandro, Manuel [349] see Gallegos Gomora, Miriam Judith

Acosta-Ochoa, Guillermo (Instituto de Investigaciones Antropológicas), Emily McClung de Tapia (Instituto de Investigaciones Antropológicas), Diana Martínez-Yrizar (Instituto de Investigaciones Antropológicas), Carmen Cristina Adriano-Morán (Instituto de Investigaciones Antropológicas) and Jorge Cruz-Palma (Instituto de Investigaciones Antropológicas)**[13]** *Prehispanic Plant Remains from Altica, Teotihuacán Valley, Mexico*

Altica, situated in the southeastern sector of the Teotihuacán Valley, represents the earliest known farming community in this region. Its importance lies in the potential for the recovery of evidence for domestic plant use by these early inhabitants. Plant remains recovered over several decades in the Teotihuacán Valley provide an idea of the predominant plant communities in the area during the Early-Middle Formative, an indicator of local environmental conditions. Preliminary results from the analysis of macrobotanical remains recovered from excavation contexts, together with phytoliths and starch grains from selected stone tools contribute to an understanding of local economy and agricultural production in this community.

Acuña, Mary Jane (Washington University in St. Louis), Varinia Matute (Calgary University), Carlos Chiriboga (Yale University) and Francisco Castañeda (Universidad de San Carlos de Guatemala)**[131]** *The Cultural and Natural Landscapes of El Tintal, Guatemala: Preliminary Results of the Application of Airborne Lidar*

In this paper, we present the results of our preliminary analysis of the application of lidar (light detection and ranging) imagery of the archaeological site of El Tintal in northern Guatemala. El Tintal is an extensive site with over 800 known buildings distributed in an area of about 12 km². From the Preclassic through the Late Classic Periods (ca. 400 BC to AD 850), the cultural settlement developed in direct association with the natural landscape marked by extensive bajos (seasonally inundated natural depressions). Initial mapping efforts and pedestrian surveys have revealed that in addition to having adapted construction to the natural terrain, the population of El Tintal also invested significant efforts in water management systems throughout the site.

Acuña, Mary Jane [337] see Matute, Varinia

Adam, Elhadi [57] see Biagetti, Stefano

Adams, Aron, Lori Reed (NPS) and Linda Scott Cummings**[373]** *Closing the Gap at Aztec Ruins: Refining the Dating Sequence Using Corn and Pottery*

Excavation of a recent test unit at Aztec West revealed stratigraphic deposits yielding corn samples that were well distributed throughout. The primary research objective was to use Accelerator Mass Spectrometry (AMS) Radiocarbon dating to date charred corn from the test unit and compare the results with date ranges for pottery from the same levels. A tree-ring date of AD 1130 was also obtained from charred wood in a pit feature below the levels yielding corn, suggesting that the deposits, corn, and pottery in the levels above post-date AD 1130. AMS dates on the corn samples correlate well with the relative ceramic dates and the tree-ring date, supporting the initial interpretations of the stratigraphy in the test unit. The study provides well-dated evidence of the McElmo phase occupation of Aztec West, which Earl Morris doubted during his early twentieth-century excavation of the site.

Adams, Christopher [4] see Campetti, Casey

Adams, Karen (Crow Canyon Archaeological Center)

[84] *Taming Wild Plants: How Hard (or Easy) Can It Be?*

Ancient diets in the Hohokam area of central and southern Arizona included indigenous domesticates. Evidence for domesticated Little Barley (*Hordeum pusillum*), Mexican crucillo (*Condalia warnockii*), and amaranth (*Amaranthus*) rests on morphological changes. Range extensions into higher/lower areas are cited for management of agaves (*Agave*) and cholla (*Opuntia*) plants. Here I consider the process of domestication, and suggest that one or more mutations in nature plus one observant human may be all that was needed to domesticate some plants. Recent recognition of domesticated Little Barley grains in a Basketmaker III (AD 750) site in southwestern Colorado raises the issue of independent domestication.

Adcock, Sarah E. (University of Chicago)

[285] *Thinking through Zooarchaeological Approaches to Empire and Environment*

In this paper, I explore the intersection of empire and environment in imperial and post-imperial contexts using the collapse of the Hittite empire and its aftermath in central Turkey around 1200 BC as a case study. More specifically, I mobilize zooarchaeological evidence from the Hittite capital of Hattuşa and from Çadır Höyük, a rural town, in order to discuss how we might distinguish between political, economic, and climatic factors in our interpretations of the relationships between empire and environment. This analysis focuses on quantitative models commonly used by zooarchaeologists to characterize interactions between humans and the environment. Here, I use these models to facilitate synchronic and diachronic comparisons between capital and provincial town in both pre- and post-collapse contexts. At the same time, I explore the possibilities and limitations these models hold for increasing our understanding of the relationships between empire and environment.

Adderley, Paul (University of Stirling), Mitchell Power (University of Utah, USA) and Valery Terwilliger (University of Kansas, USA)

[171] *Geoarchaeological Assessment of Long-Term Site- and Field-Management Characteristics at the Pre-Aksumite Site of Mezber, Tigray Plateau*

The ancient polities of the Tigray Plateau and this region's pronounced climatic variations combine to create a research paradigm where social-environmental interactions can be considered over the long-term. Existing regional-scale indicators suggest that human responses to climate variability differed between peoples, polities and time-periods. Framed by an ongoing regional study designed to examine high-resolution climate and environmental markers at a broad-spatial scale, the study of the Pre-Aksumite (1600 BCE—1 CE) site of Mezber allows more refined a site-level understanding of anthropogenic interactions to be developed, both site-use and agrarian land management. This paper considers a set of geoarchaeological measurements and land-use proxies, including micromorphology, image analysis and inorganic chemical analysis of the sediments for this site. The complex dynamics between regional climate variations and indicators of past fire-husbandry and land management at this site are then explored.

Adderley, Paul [171] see Terwilliger, Valery

Admiraal, Marjolein (University of Groningen)

[229] *Organic Residues from Durable Vessels in Prehistoric Southwest Alaska*

Prehistoric people of coastal southwest Alaska used clay and stone vessel technologies for the past 3,000 years. Despite the challenges that the cold and humid subarctic climate posed to the procurement of clay and the drying and firing of pottery, people invested their valuable time and energy in the manufacture and maintenance of these durable vessels. Why? What role did container technologies play in the wider process of food procurement and processing? An increased focus on marine resources seems to have led to the emergence and spread of pottery in Alaska. Vessels may have been used for the rendering of marine mammal fats into oil to be used as fuel. To test this hypothesis lipids, isotopes, and proteins from food residues of about 100 vessels from 32 archaeological sites in the Aleutian Islands, Alaska Peninsula and Kodiak Archipelago have been analyzed at the BioArCh laboratory of the University of York, UK. Establishing the contents of the vessels provides direct evidence for vessel function and contributes to the greater understanding of food technologies in prehistoric Alaska.

Adovasio, J. M. (Florida Atlantic University)

[377] *Perishable Artifacts from the Old Vero Site (8IR009), Indian River County, Florida*

Despite depositional conditions inimical to the preservation of plant fiber or wood-derived artifacts, several such objects have been recovered during the ongoing re-excavations of the Old Vero Site (8IR009) in Indian River County, Florida. These include a minute fragment of charred, three ply, braided cordage with a contiguous underlying date of ca. 9,000 calendar years ago and a specimen of charred, flexible basketry or textile directly dated to 7989 ±19 calibrated radio carbon years ago. The technology of both specimens is consistent with analogous forms recovered from the celebrated Windover Bog site in Brevard County, Florida. The construction attributes of the Vero specimens are described and the potential significance is addressed.

Adriano-Morán, Carmen Cristina [13] see Acosta-Ochoa, Guillermo

Adriano-Morán, Carmen Cristina [293] see Pérez Pérez, Julia

Aebersold, Luisa [83] see Hart, Thomas

Ævarsson, Uggi [190] see Woollett, James

Agarwal, Sabrina (UC Berkeley)**[31]** *Bone Remodeling Behavior across the Surfaces of the Skeleton as Biographical Windows*

The morphology of the whole skeleton is crafted over the life course by bone remodeling across its skeletal surfaces: the endosteal surface of its trabeculae, and on the periosteal, endocortical, and intracortical surfaces of its cortex. The behavior of each of these surfaces differs between individuals and populations resulting in some understood differences in bone morphology across human groups. But the skeletal surfaces are also differentially influenced during growth, aging, reproduction, activity, disease, and other aspects of life experience. Analyzing aspects of bone quantity and quality at these various bone surfaces can provide windows into bone remodeling events of the once living skeleton. This paper will demonstrate how scaling between this record of cellular activity at the level of tissue, bone, skeleton, and community, bioarchaeologists have the potential to reconstruct aspects of past life history. An appreciation of the biology that undertakes the construction of the skeleton at its most basic cellular level extends the concept of the osteobiography. At the same time, an appreciation of the biocultural influences on this basic cellular activity provides a more humanistic perspective on our reconstruction of the person from the skeleton.

Agenten, Courtney (Project Archaeology), Jeanne Moe (Project Archaeology/BLM) and Tony Hartshorn (Montana State University)**[97]** *Putting Archaeology Teacher Workshops to the Test*

Students are assessed constantly throughout the school year. As teachers we ask ourselves how do I know that the students understand the concepts and skills? Archaeology educators should be conducting the same kind of rigorous evaluation of the professional development courses we offer teachers. Challenging our profession to know where teachers are coming from, what their needs are, where we want them to go, and how we know that they learned. What prior knowledge do teachers bring to a workshop? Have they been exposed to inquiry-based learning? How do they feel about teaching archaeology? How will they use the educational materials in their classroom after attending? These questions and more are necessary to understand the purpose and outcomes of archaeology-centered professional development. Project Archaeology conducted a study of ten teachers who participated in a five-day course on a developing curriculum guide, Project Archaeology: Investigating a Roman Villa. The results of the research will inform future studies on how archaeology educators can conduct similar assessments of teacher pedagogical content knowledge to determine the efficacy of professional development for educators.

Agostini, Mark R. [34] see Catanach, Samuel

Agüero, Carolina (Instituto de Investigaciones Arqueológicas, Universidad Católica del Norte)**[134]** *Intervención de la Textilería Local como Estrategia del Tawantinsuyo para Vincular a las Poblaciones de Atacama con el Noroeste Argentino (1350–1535 Dc)*

Los materiales textiles tienen la capacidad de contener información relacionada con situaciones de contacto cultural y el grado de intensidad de éstas. Bajo este principio se estudió en forma sistemática la textilería del sitio Doncellas en el Noroeste Argentino—tanto aquella que se encuentra en el Museo Etnográfico Juan B. Ambrosetti en Buenos Aires, como la porción depositada en el Museo del Pucará en Tilcara—y aquella proveniente de sitios del Salar de Atacama y de la cuenca del Loa, principalmente del sitio Cementerio Poniente de Quillagua. Esta tarea se realizó con el fin de obtener datos relevantes que ayuden a comprender la dinámica de las relaciones que existieron entre estos territorios vecinos durante los períodos Intermedio Tardío y Tardío. Los resultados de este análisis nos llevan a proponer que el nexo establecido entre ambos se habría desarrollado con mayor intensidad hacia 1350–1535 Dc, siendo posible asumir la existencia de un proceso expansivo que llevo a vincular ambos territorios, en asociación a los intereses del imperio Inka.

Aguero Reyes, Adriana (Independent)**[267]** *Architecture and Figurine Art in Central Veracruz*

Terracotta figurine offerings as part of construction deposits are one of the traits that characterize the Classic period Central Veracruz culture. They are recurrent in both modest and monumental architecture, in sites of all ranks. In this they differ from ceramic figurine use in contemporary cultures, where they belong to the domestic and/or funerary sphere. This paper presents a case study on a series of figurine deposits of a palatial residence of the archaeological site of La Joya, showing that the qualities of size and finish and the form of disposing of the figurines will vary according to whether the deposit is placed at initial construction, rebuilding, or as part of a termination offering, reflecting different forms of ritual practice. An initial comparative analysis will evaluate if these patterns apply to other cases within the same culture area.

Aguilar, Joseph (University of Pennsylvania) and Robert Preucel (Brown University)**[34]** *Seeking Strength and Protection: Tewa Mobility during the Pueblo Revolt Period*

The Pueblo Revolt period (1680–1700) was a time of considerable social unrest and instability for Pueblo Indian people. The return of the Spaniards twelve years after the 1680 revolt required new strategies of resistance. Mobility became a key form of resistance and, the Tewa world in particular, provided a landscape in which pueblo communities could seek the strength and protection to survive. Many families left their home villages and took refuge with their relatives on mesa villages and in isolated mountain camps. In some cases, Pueblo leaders sent their women and children away for safety and security. In this paper, we consider mobility among the Tewa people, across their landscape during the Spanish Reconquest, as resistance strategy. Particular attention will be paid to the mobility strategies of San Ildefonso Pueblo to mesatop and upland areas during the reconquest.

Aguilar, Felisa (Centro INAH Coahuila), Ana Rugerío (Dirección de Registro Público de Monumentos y Zona) and Ulises Cano (Dirección de Registro Público de Monumentos y Zona)**[328]** *From Scientific Specimens and Curiosities of Nature to Heritage Assets: Its Listing in the Public Registry of Archaeological Zones and Monuments*

Fossils are physical evidence that provides important information in order to figure out and explain the origin and evolution of life on Earth. For this reason, an accurate recollection and preparation are necessary. A precise data collecting also is required. Fossils must be preserved in scientific collections where they will be studied and where they will receive the status of specimens. In addition, for non-scientists these objects could be curiosities of the past from Nature which are also objects for collecting. In Mexico, fossils are recognized as national heritage, nevertheless it was not until 1986 that INAH was designated as the institution in charge of them, having modified its Organic Law and having added the article 28bis to the Federal Law of Archaeological Zones and Monuments, Artistical and Historical. According to this, INAH executes different actions to fulfill these responsibilities, for not only scientific collections, but private too and paleontological sites. Generating data sheets of records with the final goal to extend the legal declaration of the existence of these goods. This tool was developed to follow up and have control of specimen records and legal protection, key aspects for conservation and protection of this heritage.

Aguirre, Alejandra (Proyecto Templo Mayor/UNAM)**[225]** *The Symbolism of the Animals Found inside Offering 125 of the Great Temple of Tenochtitlan*

In the seventh field season of the Templo Mayor Project, we discovered various ritual deposits in an inverted pyramidal monument located west of the monolith of the Tlaltecuhli Goddess. We determined that this space symbolized the threshold to the underworld, or realm of the dead. In this space we made the exceptional discovery of the Offering 125, associated with the ruler Ahuizotl (1486–1502 CE). In this offering we found three flint knives that were dressed like Ehécatl-Quetzalcóatl (God of Wind). Two knives are decorated with spider monkey skin (*Ateles geoffroyi*) and in one case, a green stone duck effigy pendant. These elements were in association with two golden eagle skeletons (*Aquila chrysaetos*) and a wolf skeleton (*Canis lupus*). The employment of different symbolisms of animals refer to various aspects of Mexica cosmology. The animals occupy a specific location in the interior of the offerings and thus play a specific role within the offering's narrative.

Ahern, Kaitlin**[321]** *Reexamining the Identity of Reverential Termination Rituals in the Maya Lowlands*

In the pursuit to understand ancient Maya ritual, researchers have commonly relied upon the analysis of termination rituals and caches. In the early 2000s, Jonathan B. Pagliaro, James F. Garber, and Travis W. Stanton introduced a clarification of the terminology, differentiating between reverential and desecratory termination rituals. Following this publication, a surge of studies conceptualizing desecratory termination rituals emerged, while the literature on reverential termination rituals remained sparse. Even today, the interpretation of reverential termination rituals remains particularly broad and unclear. Specifically, there is no clear demarcation separating reverential termination rituals from dedication rituals or even from desecration termination rituals. This ambiguity has made it difficult to properly identify the occurrence of this type of ritual in the archaeological record. Therefore, it is necessary to reconceptualize reverential termination rituals and establish a more concise definition of this ritual act. This examination draws from various case studies from across the Central Maya Lowlands to establish a list of characteristics associated with reverential termination rituals.

Ahlich, Robert (UW-Milwaukee)**[4]** *Collecting Copper and Systematic Archaeological Analysis*

The Old Copper Complex is represented by tens of thousands of copper artifacts recovered from locations widely scattered across the landscapes of the Western Great Lakes. Many of these artifacts continue to be collected and curated by avocational archaeology enthusiasts with characteristically poor contextual information. Traditional scholarly study of this complex has been restricted to the consideration of copper as a symbolically potent object and the construction of artifact typologies. This has resulted in a lack of emphasis on the role that copper played in the subsistence and economic systems of the people who depended on it. This research addresses the acquisition, use, and discard of copper artifacts through the systematic study of the Jim Bussey Collection from both northern and southern Wisconsin localities. Morphological artifact types, their relative distributions through space and time, LA-ICP-MS based sourcing data, and use-wear patterns are used to develop an archaeologically useful dataset despite poor provenience.

[264] *Chair*

Ahlich, Robert [264] see Sterner, Katherine

Ahrens, Kami (University of Nebraska-Lincoln) and Phil Geib (University of Nebraska-Lincoln)**[368]** *Analysis of Human Hair Bands from Old Man Cave, Utah*

In the early 1990s, excavations conducted at Old Man Cave in southeastern Utah unearthed various Basketmaker II materials, including an incredibly well-preserved bundle of burden bands made from human hair, dog hair, and yucca cordage. Radiocarbon dating places the manufacture of these textiles between 170 BC and AD 135. The bundle, when unfolded, contained a complex set of artifacts, including two smaller fragments that appear to be carrying bands, and another far more unique woven artifact. Resembling a load-bearing strap, this wide-split woven band consists of two narrow tumpline-like bands joined at each end, displaying considerable upkeep and maintenance. Only one other artifact known to the authors bears a similar form, but the functions of both remain unknown. Regardless, these woven artifacts provide a case study for examining textile production methods and use in the San Juan region of the American Southwest. Analysis of fibers, twist, ply, weave, wear patterns, and predepositional repairs can help illuminate the method of skill transmission and cultural interactions that existed in preceramic Southwestern societies. The foundational knowledge for these and other analyses is established by a thorough examination of the artifacts at hand and relevant comparative pieces.

Aiello, Leslie [70] see Aldenderfer, Mark

Aikens, C. Melvin (University of Oregon)**[279]** *Discussant***Aimers, Jim (SUNY Geneseo)****[187]** *Maya E-Groups and the Nature of Science—Ours and Theirs*

Maya E-Group architectural assemblages have attracted scholarly attention for about a century, and yet our ideas about them have become more muddled through time. Since the beginning of investigations in the 1920s these structures have been thought to have had some astronomical function, but the exact astronomical significance suggested by archaeologists has changed through time. Today there is very little agreement about their meaning and function. In this presentation I will briefly review the history of the problem with an emphasis on the nature of the evidence that has been presented and how it has been presented. Rather than attempting to provide a definitive interpretation of the function of these buildings, I will argue that we have become increasingly, and perhaps dangerously, bold in our willingness to draw broad conclusions from limited evidence. The Maya E-Group problem sheds light on how interpretations become accepted as fact in archaeology, and the nature of scholarship in a fast-paced world.

Ainis, Amira F. (University of Oregon), René L. Vellanoweth (Department of Anthropology, California State University), Nicholas P. Jew (Department of Anthropology, University of Oregon), Antonio Porcayo Michelini (Instituto Nacional de Antropología e Historia [INA]) and Andrea Guía-Ramírez (Instituto Nacional de Antropología e Historia [INA])**[181]** *Investigating Prehistoric Fisheries: Growth-Band and Stable Isotope Analyses on Otoliths of a Critically Endangered Species (Totoaba macdonaldi) in the Upper Gulf of California, Mexico*

Over 700 fish otoliths were recovered during archaeological excavations at the Rancho Punta Estrella sites on the northern Gulf coast of the Baja Peninsula of Mexico; over 120 of these have been identified as totoaba (*Totoaba macdonaldi*, Sciaenidae), a critically endangered species due to pressures from commercial fishing and human alterations of the Colorado River. AMS radiocarbon dates on seven totoaba otoliths suggest two primary

occupations at ~4900–5400 cal BP and ~800–1150 cal BP. This study incorporates several analytical techniques for totoaba otoliths including: growth-band analysis, stable isotopes, and morphometric measurements; which are used to establish age and size estimates, and reconstruct local environmental conditions (SST). Oxygen ($\delta^{18}\text{O}$) and carbon ($\delta^{13}\text{C}$) isotope ratios have been used to generate inferences on the local habitats and life histories of totoaba, determine the season of capture, and investigate seasonal shifts in water temperature and salinity in the upper Gulf of California. Comparisons of archaeological and modern specimens revealed that pre-dam juveniles grew faster and matured earlier than post-dam totoaba. Our study contributes to the prehistoric record for this species, expanding our knowledge of indigenous fishing practices in the region and species-specific impacts related to the divergence of major waterways like the Colorado River.

Ainis, Amira F. [300] see Bender, Morgan

Ainsworth, Caitlin (University of New Mexico)

[368] *Late Spanish Colonial Subsistence Practices and Their Environmental Impact in the Middle Rio Grande Valley*

In 1598, Spanish colonialists introduced European domestic fauna, including sheep, pigs, and cattle, into New Mexico's Middle Rio Grande Valley (MRGV). Sometime after this initial contact, Native residents of the MRGV shifted away from the use of a diverse set of native fauna and focused their diets on non-native domestic taxa. This shift had far reaching effects; reliance on domestic grazers ultimately led to overgrazing, erosion, and loss of native species—all of which characterize the modern Southwestern landscape. Knowledge of the timing of these changes is critical to understanding their impetus and effects. Recent research suggests the shift from exploiting a diverse resource base to reliance on a small number of domesticates occurred after the end of the seventeenth century but before the beginning of the twentieth century. However, a lack of zooarchaeological data from sites occupied during the eighteenth and nineteenth centuries has thus far prevented more specific dating of this critical transition. Analysis of the faunal assemblage from Los Ranchos Plaza, occupied AD 1750–1904, is helping to fill this knowledge gap, and improve our understanding of changes in the nature of human and environmental interactions following the Columbian exchange.

Aitchison, Kenneth (Landward Research Ltd)

[122] *Discovering the Archaeologists of the Americas: Pilot Project*

SAA has developed a plan to investigate the demographics of the archaeological profession in the Americas, looking to bring together knowledge and advice on how the profession of archaeology (in Cultural Resource Management, academic, government, museum, self-employed, and other contexts) is structured throughout North, South, Central America, and the Caribbean. This proposed Discovering the Archaeologists of the Americas Initiative intends to conduct a series of linked surveys that will gather, analyze, interpret, and share information on archaeological employment and education across all of the countries of the Americas. This will set up a process by which the survey can be conducted periodically to examine the development of the profession over time. This will also allow direct comparisons to be made between archaeological employment in the Americas with Europe, where previous work has been undertaken, and potentially other areas of the world. SAA, together with Landward LLC, have begun to undertake the Pilot phase of that overall project, carrying out targeted research in two geographical areas—the Republic of Chile and the USA State of New Mexico. This will then inform SAA's decision-making process ahead of the potential implementation of the full, overall Discovering the Archaeologists of the Americas Initiative.

Aiuvalasit, Michael (Southern Methodist University)

[368] *Common Goods in Uncommon Times: Water, Droughts, and the Sustainability of Ancestral Puebloan Communities in the Jemez Mountains, New Mexico (AD 1100–1700)*

The Jemez and Pajarito Plateaus of the Jemez Mountains share similar cultural, environmental, and climatic contexts, yet large Ancestral Puebloan communities of the Pajarito abandoned mesa-tops for lowlands of the Rio Grande during the sixteenth century while occupations of the Jemez Plateau persisted until the seventeenth century. Droughts are hypothesized as a driver of depopulation of the Pajarito Plateau, but if so why wasn't the Jemez abandoned as well? Prehistoric communities built water storage features (reservoirs) at most large villages. These common pool resources serve as archaeological proxies for how communities took collective action to reduce the risk of water scarcity. Geoarchaeological investigations at 15 prehistoric water reservoir features at 9 sites across both regions, combined with geospatial analyses of hydrogeology and settlement histories allow the close evaluation of relationships between resource management, climate, and population dynamics. Communities of the Jemez Plateau used their reservoirs for the entire length of occupation. Reservoirs on the Pajarito Plateau stopped being used during droughts in the mid-1400s. Subtle differences in precipitation and geohydrology made Pajarito communities more vulnerable to droughts, but key differences in social organization likely played a greater role in the divergent trajectories of this region.

Aja, Adam [252] see Fu, Janling

Akmenkalns, Jessika (University of California, Santa Barbara)

[203] *Cultural Continuity and Change in the Wake of Ancient Nubian-Egyptian Interaction*

This paper addresses the effects of long-term contact and colonialism among ancient Egyptian and Nubian communities during the Kerma period (ca. 2500–1500 BC) in northern Sudan. A wide array of theoretical perspectives on culture contact and colonialism has emerged in recent decades, highlighting the diverse range of outcomes that can result from extended periods of interaction and struggles for political control. Such cross-cultural interactions may occur in the context of information exchange, trade networks, military conflict, and interpersonal relationships, precipitating an ever-changing social and cultural milieu. I investigate these conditions at the sites of Hannek and Abu Fatima, both Kerma period sites located in the hinterlands surrounding the Kerma political and economic center. The results of this study stem from excavations conducted in 2015 and 2016 and indicate that while the Kerma residents of Hannek and Abu Fatima incorporated a small selection of Egyptian objects and practices during the period of contact, the archaeological evidence suggests that these communities largely adhered to indigenous cultural traditions, even in the later part of the Kerma period when Egyptian colonialism was at its apex. This research stands to contribute to our understanding of how interaction shapes the negotiation of identities in borderland regions.

Akoshima, Kaoru (Tohoku University)

[42] *Toward Standardization of Lithic Use-Wear Identification in Conjunction with Technological Organization and Raw Material Variability*

The paper examines theoretical problems concerning characteristics of lithic microwear traces in the Paleolithic. Use-wear studies already experienced 40 years of research since the discovery of micro-polish varieties which reflect worked materials with wide applications to site structure analysis. However, global standardization of identification criteria still needs comparative efforts, especially on raw material variability and behavioral diversity among regional settlement and subsistence systems, hence experimental replication programs. The present research investigates comparative framework of use-wear classification and interpretation for both “low-power” (microflaking) and “high-power” (micro-polish) methods, with special

reference to the “technological organization” concept by Binford. Use-wear data is evaluated in terms of complex human mobility patterns over the landscape and technological dichotomy between “curated” and “expedient” components with raw material availability and distributions. Case studies are selected from the Upper Paleolithic of Northeastern Japan. The Mogami River project in Yamagata Prefecture by Tohoku University (1984 to 2016) including the Kamino A site, the Marumori 1 site, the Takakurayama site, the Hakusan E site, and the Hakusan B site, provides concrete data bases for discussion. Experimental framework by the Tohoku University team since 1976 is utilized for wear pattern standardization.

Alaica, Aleksa (University of Toronto)

[238] *The Health of the Herd: Considering Camelid Herding from Late Moche Peru*

The herding of camelids in the precolumbian past impacted daily and ritual life of peoples residing there. During the Late Moche period of Peru, camelid herding was a major factor in the trade and exchange of goods, people and ideas. The extent of herding and the degree of camelid breeding in the coastal desert has been understudied. This paper will discuss the patterns in camelid age profiles and pathologies to inform the extent to which camelids were traveling along the coast and into the highlands. The broad age profiles evident from detailed analysis displays a broad range of herds coming to the Late Moche site of Huaca Colorada (AD 650–850). These data indicate that the long-held view that breeding of camelids was localized to the highlands needs to be revised. The osteological evidence from Huaca Colorada reveals the biological constraints imposed on Moche communities residing here and the demands of localized breeding to account for the numerous juvenile camelid burials uncovered in mortuary contexts and those uncovered in feasting middens. In the end, the varied exchange from possible highland and coastal locations shows that individuals may have been coming from long distances to visit and engage with activities at Huaca Colorada.

Alaica, Aleksa [178] see Culquichicón-Venegas, María José

Albanese, John (University of Windsor)

[235] *Skeletal Evidence Suggesting Biological Continuity in the Ruling Lineage throughout the Late Helladic, Sub-Mycenaean, and into the Dark Ages on the Greek Island of Kefalonia*

The cluster of sites on Borzi Hill near the village of Tzannata on the island of Kefalonia includes several habitation areas and various tombs. The evidence suggests an extensive occupation during the Mycenaean (Late Helladic) Period, including the largest tholos or “beehive” tomb in the Ionian Islands. The tomb was built around 1350 BC at the same location as an older tomb that had collapsed. Although the tomb was looted in antiquity, excavations have yielded a number of notable finds including the remains of several dozen people. All the adult mandibles studied thus far in 2015 and 2016 that are not too damaged to be analyzed, fall into two very distinct patterns by sex. All the males, including the last individual buried in the tomb, have the same distinctive mandibular morphology. The last individual was interred in a distinct style that is not seen on the island until well into the Dark Ages, around the ninth century BC. If this morphology is inherited, the evidence suggests the royal lineage retained a prominent position in the community spanning various upheavals including the complete collapse and displacement of the Mycenaean civilization.

Albeck, María, María Amalia Zaburlin (Universidad de Jujuy, Argentina), José Luis Tolaba (Universidad de Jujuy, Argentina), Diego Martín Basso (CONICET—Universidad de Jujuy, Argentina) and María Elena Tejerina (Universidad de Jujuy, Argentina)

[222] *Far South: An Altiplanic Settlement in Northwestern Argentina*

Pueblo Viejo de Tucuté is the southernmost prehispanic (Late Intermediate Period) settlement with altiplanic roots so far recorded. It has nearly 600 dwellings installed in the mountain range southwest from Casabindo in the Puna de Jujuy, an altiplano like highland. The site is unique in the area, with particular architectonic features that differ from contemporaneous sites (Puna de Jujuy, Quebrada de Humahuaca, Valle Calchaquí). The houses are round, well built in cut stone with a diameter that ranges from 4 to 6 m. Several findings recovered during excavation resemble some from the Peruvian and Bolivian Altiplano, as described in colonial chronicles and ethnographic investigations although some characteristics are peculiar to the site. A brook clearly divides the settlement area in two, and in the middle rises a pucara presumably occupied only in times of conflict. 26 radiocarbon dates establish its occupation from the end of the tenth century to the first half of the fifteenth century. The early radiocarbon dating of the site outranges by a couple of centuries the moment proposed for the massive migrations of highland people in the Andes, due to climatic stress by drought during the twelfth and thirteenth century.

Albert, Rebecca (Michigan State University), Caitlin Clark (Michigan State University), Susan Kooiman (Michigan State University) and William Lovis (Michigan State University)

[21] *A-Maize-ing: Phytolith Evidence for an Early Introduction of Maize in the Upper Great Lakes Diet*

There is no recorded maize (*Zea mays* ssp. *mays*) at Laurel or North Bay Initial/Middle Woodland sites in the northern Lake Michigan-Huron or Superior basins of the western Great Lakes, despite the presence of maize microbotanicals in Michigan, New York, and Quebec as early as 400 BC. To evaluate the potential for an early maize presence in this region, samples of carbonized food residues adhering to sixteen ceramic vessels from the Laurel/North Bay Winter site (20DE17) were processed and analyzed. Low incidences of maize starches and phytoliths were present in multiple samples, three of which were dated to as early as the second century BC, 800 years before regional macrobotanical evidence. Compression damage to some starches as well as fine grit present in several samples support the proposition that the initial dispersal of maize in the region may have been through transmission of meal or flour, which was then incorporated into existing cooked dishes by local populations. The lack of maize macrobotanicals for centuries thereafter suggests that maize did not immediately become a significant component of regional cuisine until long after its initial introduction to the Upper Great Lakes.

Alberti, Benjamin (Framingham State University)

[65] *Moderator*

Albrecht, Conrad [118] see Pezzutti, Florencia

Alcaina Mateos, Jonas [274] see Lancelotti, Carla

Alcantara, Keitlyn (Vanderbilt University Department of Anthropology)

[215] *“Eating Locally” in Tlaxcallan: The Impacts of Political Economy on Postclassic Diets*

Late Postclassic Central Mexico is defined by significant political change, with the Aztec Triple Alliance quickly dominating the political landscape. As the triple alliance materialized in the fifteenth century, Tlaxcallan simultaneously emerged as a key market center, connecting trade in the central highlands

to the Gulf Coast. As the alliance expanded, Tlaxcallan remained a uniquely unconquered space, yet the conditions of its autonomy are unclear. Siege of trade routes and the manipulation of access to commodities (often foods key to diversifying local diets) was a central tactic used by the Triple Alliance. Through bioarchaeological analysis of dietary isotopes, which reflect consumed foods incorporated into human bones and teeth, I discuss preliminary results from burials excavated in the city of Tlaxcallan's Tepeticpac district. Changes in local diets could disclose nuanced social and political relationships of market administration and economic embeddedness, and clarify the political and economic position of Tlaxcallan during this period. Differential access to foods likely also occurred at a subgroup level (age, sex, occupation, or social group). This information can be used to reconstruct social structures within Tlaxcallan, and their relationship to broader geopolitical networks of trade in order to contextualize how local political architects confronted interregional politics.

Alcántara Salinas, Andrés Saul

[183] *El caso de la Parcela 28 del Ejido de Comala, Colima: La problemática del saqueo arqueológico y recuperación de una tumba de tiro*
El denominado Occidente Mesoamericano, presentaba características únicas que lo diferenciaban del resto de las culturas de esta súper área cultural; diferencias que son claramente observables en el sistema funerario que fue utilizado por estos grupos, al cual se le denominó como: "Tradición de Tumbas de Tiro." El legado patrimonial que dejaron estos grupos se encuentra en prácticamente todo el territorio del estado de Colima, desafortunadamente este se ha visto alterado por la práctica que realizan muchas pobladores y son quienes generan el saqueo de contextos con la intención de obtener las piezas cerámicas, artefactos de piedra entre otros muchos objetos depositados al interior de las cámaras funerarias. La destrucción y pérdida de muchas tumbas ha sido una constante a lo largo de poco más de 80 años. Uno de los trabajos que realiza el INAH, es el de atención a denuncias, con los cuales le permite la intervención de áreas o sitios que están siendo alterados por el saqueo; con estos trabajos se llega a recuperar objetos diversos e información novedosa e importante, que juntos enriquecen el acervo patrimonial arqueológico de México.

Alcántara Salinas, Andrés Saúl [183] see Ortega, Allan

Alcock, Susan (University of Michigan)

[70] *Discussant*

Alconini, Sonia (University of Texas At San Antonio)

[231] *Fertility, Water, and Rock Art on the Inka Imperial Fringes: The Valley of Mariana and Samaipata*
Samaipata was one of the largest centers of the Southeastern Inka frontier. Multifunctional in nature, it was an important advance point toward the tropical lowlands. Despite the intrusions of the Guaraní-Chiriguano, this region witnessed complex processes of settlement reorganization. This was particularly the case of the fertile valley of Mairana, an important breadbasket of this frontier outpost. Occupied by the Mojocoya and Gray Ware archaeological cultures, their inhabitants produced complex rock artistry and participated in vibrant interregional exchange networks. Based on a recent survey, this poster explores the occupational dynamics of this valley, and its later incorporation into the Inka imperial economy. It also discusses the importance of rock art in indigenous ritual practices associated with water and fertility.

Alcover Firpi, Omar A. (Brown University), Charles Golden (Brandeis University) and Andrew Scherer (Brown University)

[118] *Reconsidering "Sites," "Features," and "Landscapes" in the Maya Lowlands with Remote Sensing and Ground-Based Survey*
Etic distinctions between "sites" and "landscapes" and the limits of pedestrian survey have long influenced how scholars in the Maya lowlands model social and political dynamics of the region. The adoption of remote sensing technologies, particularly lidar, has improved our ability to identify anthropogenic features over wider areas. Yet remote sensing data collection remains centered on known "sites" and data serving to further expand the mapped boundaries of ancient "cities," generally without challenging the notion of bounded settlements. Too often, research tends to emphasize a synchronic view of "sites," whose edges are often defined not by etic understandings of boundaries but by the limits of archaeological survey. Moreover, the palimpsest of cultural features, including walls, terraces, and dams dispersed on the landscape reveal a complicated history of construction and use. We suggest that only if we revise theoretical conceptions of the relationship between 'site,' 'feature,' and 'landscape' can these technologies be better used to answer new questions concerning landscape adaptation. This paper draws on recently acquired remotely sensed data and over a decade of ground-based survey data from the Usumacinta River valley of Mexico and Guatemala to offer new interpretations of landscape use and change among the Maya.

Alcover Firpi, Omar A. [131] see Garrison, Thomas

Aldenderfer, Mark (University of California) and Leslie Aiello (Wenner-Gren Foundation)

[70] *Wenner-Gren Foundation Funding for Archaeology*
Over the past 15 years the Wenner-Gren Foundation has received approximately 3,000 applications for research funding from archaeologists (students and established scholars) and have funded just under 500 of these requests (success rate = 15–16%; grand total of funds awarded = \$8,050,000). The Foundation does not fundraise and thus the amount we can award each year is dependent on the financial markets. A particular challenge is to maintain and grow the spending power of the endowment, while continuing to fund as many worthy projects as possible. Although we are not dependent on the vagaries of donors or government policies, it is not an easy investment task to achieve the necessary level of return to meet the current requirements of the field let alone funding needs that may arise as priorities of government agencies and philanthropic sources change.

Aldenderfer, Mark [286] see Haas, Randy

Alders, Wolfgang (University of California, Berkeley) and Abdallah Khamis Ali (Department of Museums and Antiquities, Zanzibar)

[307] *Preliminary Results of Geoarchaeological Sampling and Survey to Investigate Landscape History in Northern Unguja, Zanzibar*
We present the preliminary results of a study investigating long-term agricultural history in northern Unguja, the southern island of Zanzibar. In the summer of 2016, we excavated four test pits in modern rice fields to collect bulk, starch, phytolith, C14, and micromorphology samples, as well as samples from upland areas along watersheds, with the aim of characterizing contemporary and ancient land use in the rice-growing western side of the island. We also carried out brief archaeological surveys along three different watersheds, in the western, northern, and eastern parts of the island. Preliminary results suggest diverse strategies for agricultural production that varied in relation to urban development at Tumbatu and Mkokotoni in the northwest, Zanzibar Stonetown in the southwest, and settlement on the northeastern side of the island. Productive diversity existed both between and within the two broad ecological zones in northern Unguja: the deep, clayey soils in the west where rice farming is possible, and the bare, rocky bedrock

outcrops in the east where marginal banana, coconut and cassava farming exists through landscape modifications in the coral stone. We reflect on the implications of these differences for understanding long-term landscape histories in island East Africa.

Alderson, Helen (University of Cambridge)

[374] *Women Weaving Individual and Collective Identities in Kosrae, Micronesia (1824–1924)*

In Oceania, archaeologists have examined perishable ethnographic items to gain fresh insights into past people's identities. This paper presents a new analysis of nineteenth- and twentieth-century Micronesian loincloths from European and American museums, explaining how their construction offers insights into islanders' sociopolitical identities during a period of rapidly intensifying global interconnectivity. On the island Kosrae, Micronesia, tol (loincloths) were the primary garment of every polity member. Women wove tol on looms, using specific motifs to create identifiable styles. The German Southseas Expedition (1908–1910) recorded that each style materialized an individual social status, such as fisherperson or chief. I propose that in weaving tol, women also created collective social identities, such a gendered sense of self as traditional knowledge holders. While tol were indisputably Kosraean, their history is connected to a broader Micronesian weaving tradition. Tol motifs were not only passed from Kosraean mothers to daughters, but were also passed between interacting populations. This sharing accelerated after European contact (1824). In order to quantify this change, I present statistical analyses of motif transferal over time in tol, illustrating how Kosraean women used insider and outsider motifs to maintain old identities, and construct entirely new ones, in an increasingly cosmopolitan world.

Alegria, Crystal (Project Archaeology) and Jeanne Moe (Project Archaeology BLM)

[97] *Descendant Communities and Curriculum Development: Working Toward a Culturally Relevant Development Process*

Archaeological excavations at the Absaroka Agency, a Crow Indian Agency located near present-day Absaroka, Montana, provided an opportunity to develop educational materials using authentic archaeological data. Staff from Project Archaeology, a national archaeology education program, designed and developed curriculum materials for upper elementary students using the archaeological evidence from the excavations at the agency site. These materials use archaeology to teach students historical and scientific inquiry with authentic archaeological data. Crow tribal members, educators, and archaeologists collaborated to develop the educational materials with Crow community members providing the enduring understandings, or main concepts, for the materials. As this project is coming to a close, we will present our assessment and overview of this seven year project including our collaborative process, research design, and our consultation with the Crow Tribe.

Alex, Bridget [338] see Caracuta, Valentina

Alfonso-Durruty, Marta [231] see Morello Repetto, Flavia

Alix, Claire (CNRS UMR8096/Univ. Paris 1 Pantheon Sorbonne), Owen Mason (INSTAAR, University of Colorado) and Lauren Norman (Dept. of Anthropology University of Kansas)

[144] *"Untangling the timbers": New Perspectives on Birnirk Architecture in Northwestern Alaska*

Birnirk culture is well-known for driftwood structures that were repeatedly reassembled to form low mounds. The structures were "hopeless tangle[s] of logs" to pioneering 1930s archaeologists whose reports lack details on construction techniques. Birnirk houses diverge from the preceding Old Bering Sea and later Thule single room houses with lengthy entrance tunnels. Our 2016 fieldwork "followed the wood," employing enhanced photography within two exceptionally preserved houses at Cape Espenberg, to infer Birnirk architectural strategies and used diagnostic assemblages to refine cultural affiliations by comparison to Siberian Birnirk, and the transition to Thule through a high-resolution, tree-ring and 14C, chronology.

Alix, Claire [144] see Norman, Lauren

Allard, Amelie (University of Minnesota)

[128] *"Little Hope of Much Trade This Year": Merchant Capitalism and Community-making in the Late Eighteenth-Century Western Great Lakes Fur Trade*

While the North American Fur Trade has often been examined through economic lenses, scholarship from the 1980s onward has striven to demonstrate that this colonial phenomenon was more than mere trade and merchant capitalism: it also embodied a complex web of social relationships and practices that went beyond daily transactions. In this paper, I unpack the ways in which exchanges, of myriad shapes and forms, between Euro-Canadian fur traders and local Indigenous groups in the Western Great Lakes intersected socially and physically with other daily practices such as food procurement and mobility. Drawing from my research on the late eighteenth-century fur trade landscape of Minnesota and Wisconsin, I bring to light some of the ways in which Anishinaabeg and Dakota peoples (the two most powerful social formations of this area at the time) not only dictated the terms of their participation through trade and politics, but also controlled the movement of fur traders on their hunting grounds through a choice to share knowledge—or not. Lastly, I address the issue of accessing knowledge of Indigenous perceptions of this process through archaeological research, especially given the common mislabeling of post-Columbian Indigenous occupations as "fur trade posts" based on artifact assemblages.

Allard, Francis (Indiana University of Pennsylvania)

[333] *The Maritime Silk Route and Southeast China during the Han Dynasty: A View from Panyu, Hepu, and Lingnan's Hinterland*

Consisting of the present-day provinces of Guangxi and Guangdong, the Lingnan region was from early on impacted by political and cultural forces centered to its north. Following Lingnan's brief occupation by the Qin (214–204 BCE), the Qin general Zhao Tuo established the independent kingdom of Nanyue, whose defeat at the hands of Han armies in 111 BCE resulted in the region's formal incorporation into the Han Empire. Importantly, various lines of evidence dating to the Han dynasty point to Lingnan's increasingly extensive contacts with regions located further south along the so-called maritime silk route. Such evidence includes texts (indicating Lingnan's likely interaction with the Indian subcontinent), grave goods (e.g., elephant tusks, frankincense, beads made of precious stones), nonlocal knowledge (e.g., granulation), and architectural elements (e.g., stone columns). Many of these 'southern' (or 'western') elements are well represented at Panyu (the Nanyue kingdom's capital) and Hepu (a post-Nanyue kingdom coastal port), leading some archaeologists to emphasize the importance which such contacts played in Lingnan's development during the Han dynasty. However, a closer look at these foreign elements' spatial and sociopolitical patterning throughout Lingnan points instead to the likely limited impact which the Southern Maritime Route played in such developments.

Allcock, Samantha [274] see Jenkins, Emma

Allen, Kathleen M. S. [52] see Schreiner, Nina

Allen, Mitch (Mills College) and William B. Trousdale (Smithsonian Institution [retired])

[297] *Resuscitating an Archaeology Project: The Helmand-Sistan Project in Afghanistan, 1971–1977*

The Helmand-Sistan Project, conducted jointly by American and Afghan archaeologists, was the first prolonged systematic survey and excavation of the lower Helmand River region of southwest Afghanistan. It identified over 200 sites dating from the third millennium BCE to the fifteenth century CE and conducted excavations at a dozen of them. Military action abruptly halted the project, caused the demise of its collection of material culture stored in Afghanistan, and limited publication to a few focused articles on specific sites and finds. After 40 years, we are now attempting to resuscitate the project and bring it to final publication, increasingly important because of the unlikelihood of further archaeological work in this area in the future. The challenges of doing so without the ability to recheck site details on the ground, without artifacts available for further analysis, and with project members scattered or deceased, will be the topic of this presentation. The paper will also highlight some key findings of the Project, notably in the canal-fed Sar-o-Tar region east of the Helmand River, intensively occupied and farmed only sporadically because of changing climatological and hydrological conditions.

Allen, Susan (University of Cincinnati)

[27] *Halaf Seasonality and Mobility: An Archaeobotanical View from Fistikli Höyük, Turkey*

Settlement patterns and mobility during the Halaf period (ca. 6000–5400 BC) are known primarily from Late Halaf sites. On the basis of the Late Halaf pattern, Halaf economies have been characterized as having segmentary organization with some degree of pastoral specialization reflecting a broad pattern of long-term mobility. However, the paucity of floral and faunal studies, particularly for the Early Halaf, limits the visibility of economic variability over the course of the Halaf. In this regard, archaeobotanical data from the Early and Middle Halaf site Fistikli Höyük (ca. 6000–5700 cal B.C.), located in southeastern Turkey on the eastern edge of the Euphrates floodplain, facilitates more nuanced reconstructions of Halaf mobility patterns that highlight their temporal and spatial variation. At Fistikli, the relative lack of weed seeds in midden and surface samples, together with the high frequency of cereal chaff and high proportion of dendritic long-cell phytoliths in many surface samples point toward the regularity of cereal threshing on-site and the use of threshing by-products as fodder for sheep and goats. The use of both dung and wood fuel in separate burning installations may indicate repeated short-term occupation at different times of the year.

[388] *Discussant*

Allison, James (Brigham Young University)

[129] *Kinship and the Self-Organization of Exchange in Small-Scale Societies*

Circulation of material goods is common in small-scale societies. Even where exchange is not coordinated above the level of the household, goods produced in one area are consistently conveyed to distant settlements. Numerous ethnographic studies demonstrate that exchange transactions are common among kin, and that the circulation of goods in small-scale societies is structured by kinship ties. From an individual's point of view, the number of kinfolk available to exchange with and where they live strongly affect access to nonlocal goods. This paper explores the interrelationships among kin networks, settlement organization, and exchange using agent-based modeling, ethnographic studies, and archaeological data.

Allshouse, Aurora [389] see Zwyns, Nicolas

Alonzi, Elise [8] see Pacheco-Fores, Sofia

Alsgaard, Asia (University of New Mexico)

[7] *The Utility of Nestedness in Zooarchaeological Assemblages: A Study from the Northern Maya Lowlands*

Nestedness analysis suggests that the presence of specific ichthyofauna in assemblages from seven different sites from the northern Yucatán peninsula may be a result of the life-histories of those species or cultural preferences rather than being driven by environmental barriers. The results suggest that the assemblages may be derived from different populations suggesting that they are not coming from the same source. I argue that while trade is playing a role, it is also likely that ancient fishermen were obtaining fish from the surrounding environment nearest to the archaeological site. Thus, the variation in fish species between sites is a result of differential selection of fish based on their availability as constricted by their life-histories or by cultural preferences rather than environmental barriers. The local nature of ichthyofauna within zooarchaeological assemblages has been previously argued for the site of Xcambó and I suggest that this can be extended to more of the sites covered by the analysis. Only an expanded dataset at more sites will be able to provide insight into the breadth of this potential pattern; however, nestedness analysis provides the initial data for the potential in connecting fish species to local site habitats.

Alsherif, Ahmed (Sebha University, Libya)

[375] *The Cultural and Historical Connection between Tefinagh Inscriptions and Rock Art Sites in Tadrart Acacus (Southwest Libya)*

This paper discusses what kind of cultural and historical correlation between Tefinagh inscriptions and rock art in the Tadrart Acacus. The Tuareg alphabet, Tefinagh, is one of ancient African alphabets documented not only in Libya but also Algeria and Tunisia, among other countries. It is traditionally taught by a mother to all her children. This alphabet, which dates back at least to the second half of the first millennium BCE, is used by approximately 50% of the Tuareg for short messages and inscriptions. Furthermore, hundreds of Tefinagh inscriptions have been discovered in the Tadrart Acacus, some placed near or at sites with rock art. The rock art sites in the Tadrart Acacus dated from 12000 BCE to 100 CE. The study area, Tadrart Acacus, is an area of about 150 km in length and 50 km in width. It is located in the Fezzan region situated in southwest part of Libya. Tadrart Acacus hosts one of the richest concentrations of Saharan rock art and was included on the UNESCO list of World Heritage Sites in 1985. This paper attempts to undertake interviews with Tuareg people as per the questionnaire provided, and also uses standard recording sheets.

Al-Suliman, Amer [121] see Cordova, Carlos

Alt, Susan M. (Indiana University Bloomington)

[209] *Weaving Meaning into Mississippian Ritual*

Fabric is rarely recovered from Mississippian sites, although there have been a few spectacular finds. There are however other lines of evidence that speak to the use and meaning of fabric in the Mississippian world. We have recovered the charred remains, or at times structured ash of what were once bags, mats, baskets or other fabric items during excavations at a few Cahokia related sites in the American Bottom region of Illinois. The Emerald Shrine Center in particular has produced these "ghostings" of fabric, particularly in buildings that were once shrines. The repeated burning fabric as part of the

decommissioning of the shrines is striking at Emerald, as are the great numbers of spindle whorls that have been found at villages located near the shrine center. Weaving together meaningful interpretations of these fabric remains and spinning tools is possible by considering Mississippian art, ethno-historic accounts and by contrasting what is known of other Mississippian fabrics. My interpretations will be plaited together with considerations of nonhuman actors and the enchainment of powers and forces that adhere to the material world and the raw materials of fabric construction.

Alt, Susan M. [283] see Barzilai, Rebecca

Altman, Heidi (Georgia Southern University) and Tanya Peres (Florida State University)

[385] *Brother Bear: The Role of Ursus americanus in Cherokee Society*

Archaeological sites in the Southeastern United States often contain remains of the black bear (*Ursus americanus*), which, upon excavation, are placed into one of two general categories for further analysis: food or modified. The confines of these categories precondition interpretations of the bear remains, and limit possible crucial understanding of the roles of bears in the social life of the people who interacted with them. While the category of "food" can be further divided into quotidian or communal (feast) meals, the "modified" category is most frequently interpreted as "ceremonial" and left at that. Our paper, which is part of a larger series of papers, is a study in the ethnozoarchaeology of bears. We examine bears in the archaeological record from the pre-European Contact through Historic periods among peoples who lived in the region of the traditional Cherokee homeland. We compile archaeological data and combine their interpretations with information from ethnographic, ethnohistoric, and linguistic sources to offer a more robust construction of human-bear relationships, and their constancy through time into the present. By expanding the contexts through which bear remains are interpreted we offer new models for understanding the complex relationships between people and the animals whose world they share.

Altschul, Jeffrey [113] see Ciolek-Torello, Richard

Alvarado, Carlos [182] see Demarest, Arthur

Alvarado, Claudia I. (Universidad Nacional Autónoma de México)

[217] *The Palace Group at Xochicalco, Morelos, Mexico*

Xochicalco is a hilltop site located in the mountain range of the western part of the modern Mexican state of Morelos. Archaeological investigations carried out in the upper part of the site between 1994 and 2009 have provided several breakthroughs in our understanding of one of the most representative sites of the Epiclassic period in Mesoamerica. The site's major building complex, known as the Acropolis, is situated on the very top of the hill. Covering approximately a hectare, this group comprises ten structures interconnected by corridors and stairways. Excavations in this sector have provided multiple lines of evidence that have enabled us to identify this built space as a palace. Therefore, considering the location of the Acropolis, its architectural features, its dimensions, the recovered objects, and the evidence for a major destruction event, this paper will explain the configuration of this palace, as well as its implications and repercussions in the social space of Xochicalco.

Alvarez, Socorro, María Jesús Novelo Pérez (Universidad Autónoma de Yucatán) and Lilia Fernandez Souza (Universidad Autónoma de Yucatán)

[349] *Estudio petrográfico de la cerámica de Sihó, Yucatán, durante el Clásico Tardío y Terminal*

Sihó, sitio arqueológico localizado en el occidente de Yucatán, fue ocupado en distintos momentos de los periodos Preclásico y Clásico, aunque su ocupación más importante ocurrió durante el Clásico Tardío y Terminal. Es a este momento que corresponden gran parte de los edificios monumentales del asentamiento. La Universidad de Yucatán ha desarrollado en este sitio excavaciones que han permitido la recuperación de cerámica de diversos estratos socioeconómicos, tanto en contextos tipo elitario como en conjuntos de mediano y bajo status de los periodos Clásico Tardío y Terminal. El propósito de esta ponencia es presentar el análisis de petrografía enfocado en la textura de grano fino con el fin de obtener información de rasgos texturales que ayuden a identificar alteraciones de la arcilla para determinar parámetros de cocción en los artefactos culturales. Con base en lo anterior, discutiremos tanto los patrones de consumo y tecnología cerámica del sitio en un marco regional así como determinaremos las variaciones observables en los distintos contextos analizados enfatizando aquellas relacionadas con la forma de las piezas y su distribución en los conjuntos habitacionales del sitio.

Amador, Fabio Esteban [386] see Rissolo, Dominique

Amador, Julio (UNAM)

[175] *Landscape, Settlement Patterns and Rain and Fertility Symbolism in Rock Art: A Comparative Analysis between Chalcatzingo and Cerros De Trincheras in Mexico*

In this paper we present a systematic comparative analysis of the most characteristic cultural traits of sites, apparently distant in time and space, that share fundamental aspects, concerning basic geomorphological and landscape features, settlement patterns, and rain and fertility symbolism depicted in rock art. The direct association between political power and religious authority, social prestige and the privilege of presiding ritual performances appears to be evident. While in Mesoamerica this historical and cultural processes took place from about 1500 BC. In northwestern Mexico they began to occur around AD 800. Nonetheless, as we will try to show, similarities are surprising.

Amano, Tetsuya [144] see Fitzhugh, Ben

Amaral, Adela (UC Berkeley)

[64] *Discussant*

Amartuvshin, Ch. [113] see Ciolek-Torello, Richard

Ambrose, Stanley (U. Illinois, Urbana-Champaign) and Jibril Hirbo (Vanderbilt University Medical Center)

[287] *African Ancestry or Neanderthal-Human Genetic Admixture in Eurasians? African Diversity Matters*

Neanderthal and Denisovan genetic admixture with Eurasian modern humans, and a “signature” of Neanderthal admixture in African populations, are widely accepted “facts.” Inferences of admixture are based mainly on the assumption that Yoruba, San and/or Pygmy populations contain all African genetic variation. Variants shared among Neanderthals and modern Eurasians, but not present in these Africans, are assumed to reflect 2–4% admixture. However, genetic diversity and geographic structure are greater in Africa than Eurasia, so small samples are inadequate. Non-African ancestry lies in northern and eastern Africa. Therefore, excluding northeast African genomes automatically identifies them as “admixed” rather than as descendants of the common ancestors of Eurasians and northern/eastern Africans. For example, the Maasai of Kenya appear to have 1–3% Neanderthal admixture. How much would inferred archaic admixture with Eurasians be reduced by including Eastern and Northern Africans in admixture analyses? Adding Dinka from South Sudan to Yoruba and Pygmy datasets reduces Neanderthal admixture in modern French genomes from 2% to 1.3%. Conversely, using only Yoruba or Pygmy genomes increases estimates of Neanderthal admixture in Eurasians. Admixture should be considered unproven until more populations are used to ascertain African genomic diversity, and the alternative hypothesis of common ancestry is evaluated.

Ambrose, Stanley [154] see Goldstein, Steven

Ameen, Carly, Ardern Hulme-Beaman (University of Liverpool), Allowen Evin (University of Montpellier), Greger Larson (Oxford University) and Keith Dobney (University of Liverpool)

[85] *What Big Teeth They Have: Rethinking Mandibular Tooth Crowding in Domestic Dogs and Wolves Using Landmark-Based Metric Analysis*
Tooth crowding is one of several criteria used for the identification of domestic animals in archaeological contexts, and is used frequently in dog domestication studies to support claims of early Paleolithic domesticates. Studies of crowding have varied in their quantitative approaches, and can be improved by more robust statistical testing and the incorporation of more specimens with secure wild or domestic identifications. Here we present a landmark-based method for analyzing tooth crowding, along with a statistical framework for describing crowding between populations. Our method expands on traditional metrics used to quantify crowding and is applied to a large dataset of modern dogs, modern wolves, and Late Pleistocene wolves to examine the prevalence of tooth crowding in these populations. Results show that both modern and Pleistocene wolf specimens exhibit more mandibular crowding than domestic dogs. This contradicts generally accepted assumptions regarding the nature of tooth crowding in dogs, and domestication in general, though future studies should specifically target archaeological material to investigate crowding within distinct archaeological populations. This shows that landmark-based methods offer powerful tools for recording and analyzing tooth crowding, and that assumptions surrounding tooth crowding in the identification of archaeological canids and other mammals should be critically reexamined.

Ameen, Carly [127] see Britton, Kate

Ames, Christopher (University of Victoria)

[121] *A Multi-Proxy Site Formation Analysis of a Late Middle Pleistocene Occupation in the Azraq Wetlands of Northeastern Jordan*
The Azraq Marshes Archaeological and Paleoeological Project (AMAPP) aims to understand and evaluate the importance of the Azraq wetlands for Pleistocene hominin populations. Ongoing research since 2009 indicates that the northern wetland, the Druze Marsh, acted as a desert refugium for hominins throughout the Middle and Late Pleistocene. Excavations in the southern marsh—known as the Shishan Marsh—began in 2013 and uncovered a rich assemblage of bifaces, small tools, and flakes, along with fragmentary faunal remains. The Shishan Marsh 1 (SM1) occupation, which dates to approximately 250 ka, is embedded in a complex sedimentary sequence indicative of a transitional environment, from a lake to marshy ponds that formed at the edge of an alluvial fan. This paper summarizes the results of sedimentary and microbotanical analyses of the site’s stratigraphy, as well as site formation indicators from the lithic and faunal remains recovered during the 2013, 2014, and 2015 field seasons. We conclude with a discussion of the depositional history of the Shishan Marsh occupation, and implications for deciphering how the area was used by the late Middle Pleistocene inhabitants.

Ames, Kenneth M. (Portland State University) and Andrew Martindale (University of British Columbia)

[176] *An Archaeological Test of a Settlement Pattern Shift Recorded in Tsimshian Oral Records*
We archaeologically test a hypothesis derived from the Tsimshian oral record. That record recites a long history of settlement movement and conflict culminating in an invasion of coastal Tsimshian territory by northerners. This conflict reportedly caused the Tsimshian to temporarily abandon their coastal territories and retreat inland. We tracked settlement shifts through a site taxonomy and intensive analysis of a large 14C sample acquired by percussion coring. We found an occupational hiatus in the study area and hence cannot disprove the hypothesis. We conclude the archaeological data are best explained by the history described in the indigenous oral record.

Ames, Kenneth M. [51] see Kopperl, Robert

Ames, Nicholas (University of Notre Dame) and Meagan Conway (University of South Carolina)

[207] *Island, Mainland, and the Space Between: The Role of Geography in Shaping Community Historical Trajectories of Nineteenth- and Twentieth-Century Ireland*
This study looks at the relationship between geographical “islandness” and community formation in Western Ireland. In this paper we investigate to what degree geography shapes the social, economic and political experiences of a community. Furthermore, we examine to what extent these elements of community composition strengthen or diminish their influence on each other. We compare the nineteenth- and twentieth-century island communities of Inishbofin and Inishark, Co. Galway against the complementary mainland townlands of Streamstown, Co. Galway and the Killary, Co. Mayo. This paper traces the extent to which social dynamics (community constitution and development through time), degree of political engagement (local implementation of regional and national policy), and economic opportunity (types of local industry and extent of trade network) impact development on island communities in relation to these mainland counterparts. Using historical documents, archaeological excavation and survey data, as well as digital mapping, this comparative study shows how communities of similar historical composition, but with varying geographic situations, can result in different social, political, and economic mentalities which ultimately shaped the experience and development of the present day island and mainland communities.

Amundson, Leslie J., Kevin Grover (Stantec Consulting Ltd.), Margaret Kennedy (University of Saskatchewan), Brian Reeves (University of Calgary) and Grant Wiseman (Stantec Consulting Ltd.)

[336] *Multispectral Photogrammetry of Cultural Landscapes on the Northern Plains from Unmanned Aerial Vehicle Platforms*
As early adopters of technology, especially for creating accurate maps, archaeologists have been using Unmanned Aerial Vehicles (UAVs) to discover and record archaeological features, landscapes and excavations since they became commercially available. This project tested the use of visual (RGB),

near-infrared (NIR) and thermal sensors mounted on UAV platforms (fixed wing and multi-rotor) to discover and record archaeological features in their landscape context with georeferenced, high resolution imagery of two landscapes on the Northern Plains that contain a variety of cultural features, including stones circles, boulder alignments, stone cairns and medicine wheels. We created digital layers to compare with the results of conventional archaeological survey, in cooperation with an ongoing archaeological survey in the vicinity of the forks of the South Saskatchewan and Red Deer Rivers in southwestern Saskatchewan. We applied both Object Based Image Analysis (OBIA) and desktop visual examination of the imagery captured in this project in order to determine whether interpretation results were similar to conventional survey and whether conventional survey and UAV-based multispectral imagery recognized different features.

[336] *Chair*

Anaya Hernández, Armando (Universidad Autonoma De Campeche)

[337] *Preclassic Complexity in the Central Karstic Uplands: Yaxnohcah and its Neighbors*

The Preclassic (900 BCE—150 CE) was the period during which the earliest sedentary communities in the Maya lowlands were founded. Acts that initiated these early civic charters, such as the construction of E-Groups and communal platforms, were followed quickly by rapid expansion of communities throughout the landscape, involving population growth, monumental architecture, massive waterworks, and a high degree of sociopolitical complexity. It was also during this period when ideologies and practices in religion, statecraft, and commerce were firmly established. In this context archaeological research has been shifting its attention to the Preclassic in order to address the still impervious questions on how this growing complexity led to the advent of Maya culture. Recent archaeological excavations at Yaxnohcah and other Preclassic sites have centered on those topics that endeavor to shed some light on this complex process. In this paper we will present a review of such efforts at Yaxnohcah and situate them in relationship to the development of complexity in the Central Karstic Uplands. We focus on the adaptation of the earliest settlers to the wetland landscape during the Middle Preclassic and the subsequent early appearance of low density polycentric cities in the region.

[337] *Chair*

Anaya Hernández, Armando [337] see Carr, Christopher

Anaya Hernández, Armando [337] see Reese-Taylor, Kathryn

Anderson, David (University of Tennessee), David Echeverry (University of Tennessee), D. Shane Miller (Mississippi State University) and Stephen Yerka (University of Tennessee)

[227] *PIDBA (Paleoindian Database of the Americas): Long-Term Collaborative Research at International Scales*

Compiling and making accessible primary archaeological data from multiple sources and across large areas is one of the grand challenges facing archaeology in the twenty-first century. The Paleoindian Database of the Americas (PIDBA) has been operating for over 25 years to make Paleoindian data openly accessible online to all interested parties. Data from more than 100 scholars, including locational data on over 30,000 projectile points, has been made available in digital form that has been variously used for analyses and display. PIDBA serves as a model for collaborative interaction between professional and avocational archaeological communities across the Americas. Analytical challenges include rendering data from disparate sources interoperable, assuring the security of sensitive data, and maintaining networks of researchers providing information. PIDBA is now linked with DINAA, making the information within it even more widely accessible, and hopefully it, or a data source something like it, will continue to exist long into the future.

[256] *Discussant*

Anderson, David S. (Roanoke College)

[212] *Esoteric Spiritualities and Archaeology: Bridging Alternative Understandings of the Ancient World*

Practitioners of esoteric religious traditions express profound interest in the ancient world as a source of wisdom. Yet the view of the ancient world forwarded by these groups is often one that archaeologists struggle to understand. It is a worldview that blends perceived ancient traditions from a variety of cultures into a new milieu that results in practices such as Kemetic Yoga and beliefs in Atlantis as a spiritual home for all humanity. This paper will focus on a case study of the beliefs, practices, and history of the Theosophical Society founded by Helena Blavatsky. The ways in which this esoteric spiritual group embrace notions of the ancient world reveal opportunities for archaeologists interested in promoting heritage preservation. I will argue that archaeologists can in particular use notions of shared global heritage to advocate for archaeological preservation among esoteric audiences.

[212] *Chair*

Anderson, E. (UC Riverside) and Chelsey Geralda Armstrong (Simon Fraser University)

[172] *Archaeologies of the Heart*

This paper raises two questions: How do you investigate environmental ethics and emotions in the archaeological record, and how do we now use archaeological evidence to work with Indigenous and local people on heritage and conservation? We discuss the role of emotion in archaeology, with specific reference to cooperation between archaeologists and First Nations people in preserving heritage sites in British Columbia.

Anderson, J. Heath (Minnesota State University)

[120] *Discussant*

[120] *Chair*

Anderson, Shelby (Portland State University), Thomas Brown (University of British Columbia), Justin Junge (Portland State University) and Jonathan Duels (University of British Columbia)

[257] *Exploring the Development and Spread of Arctic Maritime Traditions through Bayesian Radiocarbon Analysis*

To address the question of why arctic maritime traditions developed and spread in the North American Arctic during the mid- to late Holocene, we applied Bayesian analysis to a large radiocarbon database (n = 1202) for northwest Alaska and the Bering Strait region. We used Oxcal to create and analyze demographic patterns in summed probability distributions. We also used Bayesian calibration models to clarify the probable timings and durations of cultural phases and key transitions in the development of arctic maritime adaptations. Our analysis indicates that northern Alaskan populations grew significantly over the last 4,500 years. Population growth was punctuated by at least two periods of population decline beginning around 1000 cal BP and again around 550 cal BP. Significant population growth in the western Arctic predates the intensification of marine resource procurement by at least 1,200 years, suggesting that population growth was a possible driver for increased reliance on marine resources. This analysis establishes a strong chronological framework for future study of the development and spread of maritime adaptations in the Arctic and beyond.

Anderson, Shelby [47] see Jolivet, Stephanie

Andersson Strand, Eva (SAXO institute, University of Copenhagen)
[209] *Discussant*

Andrea Cabello, Gloria [134] see Pestle, William

Andrews, Brian (Rogers State University) and Brooke Morgan (State Historical Society of North Dakota)

[332] *Open-Air Site Formation in Low Deposition Environments*

Studies of intra-camp spatial organization and activity area patterning in open-air camps often result in significant insights into forager behavior and social organization, but the complex spatial patterning in artifact distribution that can occur from the combination of long-term habitation, repeated habitation of the same area (due to reoccupations or to natural and/or cultural bounded space), and natural formation processes can be difficult to disentangle. A first step in doing so, however, is clarifying the effects of natural processes. Here we focus on the role that natural formation processes played in producing the spatial distribution of artifacts seen at the Mountaineer Folsom site. The site is in a low deposition environment, with less than 50 cm of Aeolian sediments deposited on the site since its occupation 10,450 years ago. As such, natural mechanisms such as cryoturbation, bioturbation, burning, treefall, and trampling play a significant role in altering original artifact associations. Furthermore the characteristics of the natural bedrock geology of the site are critical for understanding how Folsom foragers constructed the habitations structures.

Andrews, Bradford (Pacific Lutheran University)

[322] *A Postclassic City with No Blade Workshops: How Did the Calixtlahuacan's Get Their Stone Tools?*

Analysis of the obsidian artifacts recovered from households in the city of Calixtlahuaca (AD 1130–1530) indicates that prismatic blade production was not a domestic affair. Furthermore, intensive survey did not reveal evidence of onsite blade workshops anywhere in the city. This finding is at odds with what has been reported for many other Postclassic urban centers. This paper discusses why the blade-core data are not consistent with onsite blade production. It then evaluates three models for explaining how the Calixtlahuacans provisioned themselves with blades: finished blade trade, long-distance itinerant craftsmen, or local craftsmen working outside the city limits. The discussion examines why the quantity and quality of blade production artifacts do not indicate onsite blade production, and what the ratios of proximal, medial, and distal blade sections might indicate about provisioning. Evaluating how the Calixtlahuacans got their obsidian is important for understanding how the Postclassic market system was organized outside the Basin of Mexico. By whatever means Calixtlahuaca's citizens got their blades, it is clear that after the Mexica conquest of 1474, less obsidian reached the city than was previously the case. This change is likely to have had a detrimental effect on the well-being of the city's inhabitants.

Andrieu, Chloé (CNRS Université Paris I La Sorbonne), Arthur Demarest (Vanderbilt University), Paola Torres (Proyecto Regional Cancuen), Julien Sion (CNRS Université Paris I Sorbonne) and Juan Francisco Saravia (Universidad San Carlos)

[218] *On the Frontier: Raxruha Viejo, a Late Classic Highland Exchange Center*

In the Verapaz valleys, there were sites of the major exchange route used to transport jade and obsidian from the Maya highlands to the lowlands during the Classic period. The Late Classic site of Raxruha Viejo, located on the highland side of the boundary between the Classic Maya kingdoms and their Verapaz highland trading partners, has a unique architecture and material culture of highland Verapaz style but with significant lowland elements. Overall, its assemblage and architecture appear to be totally different from the nearby Classic lowland capital of Cancuen, or any other lowland site. Yet, large quantities of obsidian found at Raxruha suggest that it could have a critical role in highland/lowland trade and raises many questions about the nature of the interactions between this site and both the lowland and highland centers. Building on the Cancuen Project research, the 2016 field season is part of a new four-year regional program that aims to characterize this highland cultural tradition, establish its chronological framework and understand its relationship with the highland-lowland exchange system, as well as to investigate the causes of its abandonment around 800 AD.

Andrus, C. Fred (Department of Geological Sciences, University of Alabama)

[382] *Productivity in a Human Context: Creating and Applying Proxies Relevant to Chicama Valley Archaeology*

El Niño-related changes in marine and terrestrial productivity impacted Chicama residents in several ways, including altering available marine species, soil productivity, and by extension, the technological and economic innovations necessary to adapt. The combination of marine and terrestrial resources were central to the economy of people living in the Chicama Valley throughout the Holocene. Estimates of El Niño's effects on past marine productivity typically rely on open ocean proxies distant to where people may have lived and fished, and may not accurately reflect the day-to-day reality of people living in a particular area. Similarly, El Niño-related flooding affected terrestrial productivity through both erosion and deposition. Therefore archaeological research would benefit from new proxies focused on the times and places relevant to human economies. Such proxies are now being developed and applied to a limited extent, and will be discussed as relevant to the Chicama Valley, with particular focus on productivity changes that may or may not have impacted people over time. For example, it is unlikely marine productivity near the Chicama Valley ever diminished to the point where a lack of resources was a meaningful threat until the advent of modern industrial fishing.

[223] *Discussant*

Angelbeck, Bill (Douglas College)

[334] *Implementing Indigenous Frameworks toward the Archaeological Record: Issues, Instances, and Directions*

While archaeology concerns a Western-derived discipline, the scope of its perspective is broadening. Here, we highlight Indigenous frameworks for the analysis and interpretation of archaeological data wherever there is direct historical and cultural continuity of people and place. To this end, we attempt to map out the contours for analyses using models and theory derived from oral traditions, language, and other schema from indigenous sources to explain patterning of artifacts and features of the archaeological record. We also consider some of the issues raised in applying indigenous frameworks within the discourses of contemporary archaeology. We include two cases from our work in Salishan territory applying frameworks derived from Coast Salish (Lushootseed) and Interior Salish (Nlaka'pamux) concepts. The first involves an analysis of settlement patterns in the Upper Skagit region of Washington state using Lushootseed spatial concepts of what constitutes a village. The second example entails an interpretation of rock art sites in the Mid-Fraser Canyon of British Columbia through an indigenous theory rooted in Nlaka'pamux perspectives. We maintain that understandings of these sites are significantly enhanced by the use of indigenous frameworks, allowing for explanations that extend beyond what can be achieved through the use of Western frameworks alone.

[334] *Chair*

Anglos, Demetrios [223] see Hausmann, Niklas

Angourakis, Andreas (University of Barcelona)

[356] *Linking Land-Use Patterns to Spatial Logistics, Institutional Complexity, and Terrain Constrains in Farming-Herding Interaction: A Theory-Building Agent-Based Approach*

The relation between the main variants of preindustrial economic production in arid Eurasia, from nomadic pastoralism to irrigated agriculture, is known to have been unstable, with abundant examples of conflict and shifting patterns of land use right up to contemporary times. We present the latest development of a six-year effort, within the SimulPast project, in experimenting and generating theory that could help explain the different land use patterns. Using Agent-Based simulation models, we progressively put together mechanisms hypothesized to be relevant factors in shaping the balance of farming and herding land use within this type of setting and observe their simulated consequences under a wide variety of conditions.

We will present here the design and results of two models, NomadFrontier and NomadBorder, which were built on the exploration of two previous models, Musical Chairs and Nice Musical Chairs, and introduce new aspects: 1) an explicit penalization based on spatial distances, 2) territorial marks that regulate the access to pasture, 3) a two-level institutional structure, comprising corporate groups and political associations between these, and 4) a parametric representation of terrain constraints. Last, we will compare the simulation experiments with our assessment of several historical and archaeological case studies in Eurasia.

[268] *Discussant*

Ankele, William (University of Oklahoma)

[344] *Survey Says?!?! A GIS-Based Comparison of Site Locations and Settlement Patterns in the Gunnison Basin, Colorado*

In comparison to the Late Paleoindian period (10,000–8,000 BP), the Early Archaic (8,000–6,500 BP) in the Gunnison Basin, Colorado is a poorly understood time because of its relatively light archaeological signature. Not only do we have a lighter archaeological record, but we also see a change in technologies, such as projectile point types in this transitional period. Some archaeologists explain these observations as a result of changing environments and shifting settlement processes as new populations move into the basin. Others suggest the results may be due to survey bias, as archaeologists continue to survey portions of the basin. I will investigate whether there is a possible difference in site selection and settlement patterns between the two time periods that may indicate a reason for this lighter signature. Using R and ArcGIS, I will create a predictive model for both the Late Paleoindian sites and Early Archaic sites and then compare the results. These results will then be plotted against previously surveyed areas in an attempt to determine the reason for the relatively small Early Archaic record in the Gunnison Basin.

Annereau-Fulbert, Marie (Centro de Estudios Mayas, UNAM)

[218] *The Central Maya Highlands during the Postclassic: A Marginal Region on the Eve of the Spanish Conquest?*

Compared to its Guatemala counterpart, the region of the Chiapas highlands is known to have a marginal history in the Postclassic period. This misrepresentation is due to limited investigations since the 1960's and to inexistent ethnohistoric sources, which could provide clues for the interpretation of ethnic and settlement patterns on the eve of the Conquest. However, Spanish documents described "cacicazgos" as Chamula and Zinacantan near Jobel Valley, which is the focal point of our study. Complex colonial reorganization in the region, in addition to a delicate current social and political context, make archaeological ruins survey difficult. However, ceramic analysis from two sites and archival studies allow us to strengthen, and provide results which contrast with the previous prehispanic model for this cultural area, giving rise to interesting discussions and perspectives abroad about interactions at a regional level.

Anschuetz, Kurt F. (Rio del Oso Anthropological Services, LLC) and Kurt E. Dongoske (Zuni Cultural Resource Enterprise)

[394] *Hadiya:wa: Do You Hear What Traditional Pueblo Cultural Advisors Are Saying?*

Archaeological collaboration with traditional Pueblo communities faces many practical challenges. Archaeologists typically expect cultural practitioners to accept what archaeology entails as a scientific discipline and its approach to understanding the past. Within traditional Pueblo perspectives, archaeological excavation might not be an appropriate measure for mitigating adverse effects in the federal Section 106 compliance process. Rather than asserting the primacy of their preferences and values, archaeologists should be receptive to indigenous perceptions and attitudes about what archaeology is and what archaeology does. Hearing can facilitate the opening of communication avenues for cross-cultural explorations into the multiplicity of truths about the past.

Anschuetz, Kurt F. [34] see Garcia, Damian

Antczak, Andrzej T. (Faculty of Archaeology, Leiden University, The Netherlands) and Maria Magdalena Antczak (Faculty of Archaeology, Leiden University, The Net)

[395] *Rancherías: Historical Archaeology of Early Colonial Campsites on Margarita and Coche Islands, Venezuela*

Little is known from the present-day archaeological perspective of early colonial realities of Margarita and Coche islands located in north-eastern Venezuela, in the state of Nueva Esparta. Moreover, the island of Coche has never been surveyed archaeologically. This paper discusses the preliminary results of systematic archaeological surveys of Coche and the southern coast of Margarita Island, carried out within the frame of the Nexus 1492 ERC research project coordinated by Leiden University. Colonial materials and sites were located on both islands. All sites yielded pre- and post-1550 Spanish and other European ceramics, as well as Amerindian pottery and possibly intercultural hybrids. Activities related to pearl fishery and goat breeding are most probably responsible for the presence of the ephemeral settlements or rancherías that were located in these places. These were contemporary with and also slightly posterior to the core Spanish town of Nueva Cádiz that flourished on the island of Cubagua between 1528 and 1542.

Antczak, Andrzej T. [384] see Antczak, Maria Magdalena

Antczak, Maria Magdalena (Faculty of Archaeology Leiden University) and Andrzej T. Antczak (Faculty of Archaeology Leiden University)

[384] *"Winged Worldviews": Human-Bird Entanglements in Northern Venezuela, AD 1000–1500*

Drawing from archaeology, zooarchaeology, ethnohistory, ethnology, and avian biogeography, this paper aims at (re)constructing the interrelations between indigenous peoples and birds in north-central Venezuela, between AD 1000 and 1500. Amerindian narratives and premises of perspectival ontology from the South American Lowlands suggest that certain birds were more closely interrelated with humans than other beings. The analyses of nearly 3,000 avian bone remains recovered in six late Ceramic Age sites located on the Venezuelan Caribbean islands and on the adjacent mainland indicate that the uses of birds as food, a source of raw material, and a symbol were culturally contingent. Formal and contextual analyses of bird imagery crafted in pottery, stone, and shell also suggest culture-specific uses and entanglements. Differences are especially visible between the Cariban-speaking Valencioid pottery makers from north-central Venezuela and their neighbors from the north-western coast, the Arawakan-speaking Dabajuroid, during the last centuries before the European Conquest.

Anthony, Alexander [188] see Picard, Jennifer

Anthony, David (Hartwick College)

[221] *Ancient DNA Analysis and the Indo-European Dispersal*

New methods for analyzing ancient human DNA are introducing a new “molecular archaeology.” aDNA permits us to detect mating networks, to see ancestry evolve across generations as populations expanded or died out, to track migrants and their genes across geographic space, and to say whether and with what frequency migrants and the indigenous population mated at the destination. aDNA analysis is an unprecedented tool for the study of ancient migrations, kinship, and biological adaptation. This paper reviews recent studies of the aDNA of more than 300 prehistoric people from Europe, the steppes, the Caucasus, and Central Asia that revealed a massive migration of steppe pastoralists westward into agricultural central Europe and eastward to the Altai Mountains, previously occupied by foragers, dated about 3000–2500 BC. The dispersal of the Indo-European languages can be dated independently to the same period, after the invention of the wheel and before the IE languages differentiated in the second millennium BC. Genetics suggest a delay in intermarriage at the destination, and archaeology suggests an initial material contrast, so language shift in agricultural Europe might not have happened with the initial migration but developed later after the mobility patterns and resources of the two populations converged.

Antonelli, Caroline (University at Albany—SUNY)

[44] *The Myth of a Marginal Environment: Redefining a Yucatecan Landscape*

This paper examines shifting environmental paradigms in the Maya realm. Using Mayapán as a case study, a site long-considered to be located in a “marginal” environment for agricultural productivity, I will evaluate site resilience, sustainability, and self-sufficiency and use these concepts to create a more nuanced perspective of human-environment interactions. Data from Mayapán will be cross-referenced to other similar sites across the Maya region. I will show that assumptions about the environment in the Northern Yucatán Peninsula is rooted partly in culture historical interpretations of the previous century. Modern investigative techniques from the last twenty years have allowed for more robust scientific research that contrast the environmental perspectives of the past, challenging these long-held beliefs and opening up new avenues of research. These new investigations show that the environmental history of the Maya in the Northern Yucatán Peninsula is even more complex than previously understood. Occupation in this area is both highly adaptive and stable at different points in time.

[44] *Chair*

Antonites, Alexander (University of Pretoria)

[161] *Building a Network: Territorialization and Deterritorialization in Thirteenth-Century Northern South Africa*

Regional social complexity in southern Africa is closely tied to the rise and development of the Mapungubwe polity of thirteenth-century South Africa. Expanding political power and influence meant that Mapungubwe increasingly articulated with communities on its periphery—a relationship that is reflected in shared material culture. These hinterland sites are all located in areas where there is an absence of earlier twelfth century occupation, which suggests a process of active settling of these areas rather than extant local communities adopting the trappings of Mapungubwe material culture. The maintenance of social hierarchy at Mapungubwe is widely believed to be based in the ability of elite to attract followers and monopolize long distance trade goods. This process of concentration required spatial expansion to draw in distant resources such as gold and ivory. Paradoxically, ongoing research on hinterland sites suggest that this territorial expansion resulted in a weak hierarchical control over these remote areas, resulting in a concomitant deterritorialization as distant communities enjoyed growing autonomy and authority.

Appleby, Jo (University of Leicester)

[31] *Osteobiography as Local Biology*

Osteobiography is an increasingly popular approach, but one that can have the effect of producing unproblematic, individualized approaches to the life course. In this paper I wish to explore how we can create a theoretically informed osteobiography. I propose two strands to this. Firstly, rather than osteobiography being something that “happens to” individuals living in a society, I suggest that it constantly emerges through inter-relations with culturally specific understandings of the person that are deeply contextualized. Secondly, I bring in the concept of “local biology” to explore how, rather than tracing events that happen to bodies, osteobiography can be better conceptualized through the continual interaction of genes, environment, culture and society. This interaction shapes not just immediate responses to disease or stress, but changes the potentials of the person throughout the life-course. These ideas are explored through a consideration of the process of ageing.

Aquino, Valorie (University of New Mexico), Douglas J. Kennett (Pennsylvania State University), Yemane Asmerom (University of New Mexico) and Keith M. Prufer (University of New Mexico)

[162] *Comparison of a Community-Scale Classic Maya Political Adaptive Cycle with a Bimonthly-Resolved Paleoclimate Record from Uxbenká, Belize*

In studies of human-environment interactions, the conceptual framework of panarchy and its associated resilience theory posit that periods of stability and transformation are inevitable in what has been termed an “adaptive cycle.” This presentation discusses the reconstruction of a community-level political adaptive cycle for Uxbenká, an ancient agrarian polity in the Maya hinterlands, and explores its linkages with the broader political ideology of divine kingship and climate stress. Employing Bayesian age modeling of more than 60 radiocarbon dates associated with construction events and data on a potential dynastic lineage, along with the introduction of original, bimonthly-resolved local paleoclimate data, we assess cycles of growth, maintenance, decline and renewal in the built environment history of the civic-ceremonial precinct as proxies for the stability or instability of political power and authority. Furthermore, while multiple studies have compared cultural records with rainfall abundance and deficits, we discuss the important role of short- and longer-term climate unpredictability from an ultra-precise speleothem paleoclimate record. This work produces insights on some of the conditions that confer or erode the resilience of political actors embedded in a coupled socio-natural landscape.

Aragon, Leslie (University of Arizona)

[205] *Discussant*

Aragon, Leslie [74] see Borck, Lewis

Arakawa, Fumiya (New Mexico State University) and Trevor Lea (New Mexico State University)

[303] *Salvage Excavation: NMSU Summer Field Project at the South Diamond Creek Pueblo in the Northern Mimbres Region*

New Mexico State University (NMSU) anthropology students spent the summer of 2016 getting to know a bit more about the Mimbres people who lived more than 1,000 years ago, and along the way helped preserve their history. Eight NMSU students joined community volunteers for four weeks to explore and excavate areas of the South Diamond Creek Pueblo (SDCP) in the Gila Wilderness of New Mexico. The project had three major goals: 1) to contribute to our understanding of cultural trajectories in the northern Mimbres region, 2) to assess the damage to the site by erosion and looting activities, and 3) to learn about being stewards of cultural resources for the public at large. This project was remarkably successful and several NMSU students have used data from the excavations for their own research. Their projects are diverse and include studies of ceramic exchange, lithic toolstone procurement, and environment-human relationship on this landscape. In collaboration with NMSU students and volunteers, the SDCP project helps us improve our knowledge of when and how the Mimbres people inhabited southern New Mexico from AD 900 to 1150.

Arakawa, Fumiyasu [303] see Duran, Paul A.

Arano Recio, Diana [140] see Chatters, James

Aranyosi, Floyd, David Davis (Central Washington University), Ashley Garrett (University of California, Santa Cruz) and Caroline Hartse (Olympic College)

[194] *"Yama Village: Community College Students Develop an Archaeological Analysis of a Historic Transnational Japanese Community in Washington State."*

Olympic College has created a field school around the historic Japanese immigrant site of Yama Village, on Bainbridge Island, WA. A field school associated with a community college offers access to professional training to a selection of students who would otherwise not have access to this education. Our multidisciplinary approach provides students with comprehensive field experience in the effort to recover this "hidden chapter" in Washington State history.

Aráoz Silva, Miriam [331] see Covey, R. Alan

Arazi-Coombs, Sandra and Carrin Rich (National Speleological Society)

[273] *Restoration of Sandía Cave, NHL, New Mexico*

Sandía Cave is a National Historic Landmark that has played an important role in the history of archaeological thought about the Paleoindian period and Southwestern archaeology. The cave is also a designated traditional cultural property that is culturally significant to numerous Pueblo groups. Despite its cultural and historical significance and popularity as a tourist destination, the integrity of the cave has been severely diminished by heavy and repeated acts of vandalism over the years. It was severely blackened with soot from fires illegally lit in its interior and extensive graffiti was spray-painted inside the cave. The graffiti was thought to potentially obscure valuable information (historic and precontact markings) located on the rock surface. In 2015, a grant funded restoration work in the interior of the cave. A collaborative team of cave specialists and archaeologists (with input from tribal governments) developed a series of innovative restoration techniques to ensure that the natural and cultural significance of the site was maintained during the restoration process. This presentation will discuss the techniques that were developed and the success of the project as a way of deterring future vandalism at the site.

Arazi-Coombs, Sandra [301] see Kulisheck, Jeremy

Archer, David and Christine Mueller

[176] *Archaeological Investigations on the Lucy Islands, Near Prince Rupert, BC, from 2010 to 2013: New Evidence Relating to the Development of North Coast Culture*

In the summer of 1966, George MacDonald launched the wide-ranging North Coast Prehistory Project. One of his goals was to document the broader patterns of human settlement along the north coast of British Columbia, and in 1968, this led to the first test excavations at GbTp-1, a small seasonal encampment on the Lucy Islands, 19 km west of Prince Rupert, in the open waters of Chatham Sound. The data from that excavation showed that this remote site was already inhabited by about 2,500 years ago, placing it firmly within the Middle Period (3500–1500 BP) in the emerging local sequence. Recent work at this site, from 2010 to 2013, shows that the occupation actually began as early as 9,500 years ago. At that time, sea levels were higher, and the archaeological evidence is therefore located well above the modern shoreline. Although limited in scope, the latest research offers several new insights into that poorly known early period in the development of north coast culture.

Archila Montanez, Sonia (Los Andes University, Department of Anthropology), Mónica Berón (CONICET, Museo Etnográfico), Gabriela Musaubach (CONICET, Museo Etnográfico), Martha Mejía (Los Andes University, Department of Anthropology) and Eliana Lucero (Universidad de Buenos Aires, Museo Etnográfico)

[174] *Ancient Woods Used in a Ritual Context at Chenque I Cemetery (Pampean Region, Argentina)*

Empirical evidence of ancient ritual practices is not often found in many archaeological sites. This complex ideological aspect of past human societies has usually been reported in association with the presence of monuments such as sculptures, tombs, funeral mounds, temples and shrines and also with particular artifacts used during ceremonies and rituals such as ceramic, stone or metal vessels, musical instruments and so on. Archaeobotanical evidence could contribute enormously to the study of ritual practices particularly in contexts where ritual practices involved many other different paraphernalia including plants, animals, minerals and artifacts made of perishable materials such as wood and fibers. Identification of plant remains in itself constitutes a source of information about cultural choices. Chenque I site is a cemetery, which includes several human burials and was used between 1050 and 290 BP by hunter-gatherers groups inhabiting western Pampean region in Argentina. We studied and identify charcoals from burial structure 28 in which funerary practices such as burning of human remains have been recorded.

Ardayna, Yann (UMR 7268 Marseille) and Marc Maillot (Section Française de la Direction des Antiquités S)

[219] *The Medieval Necropolis of Mouweis (Shendi Area, Sudan): Bioarchaeological Insights*

The site of Mouweis is a Nilotic city of the Meroitic period excavated by the Louvre Museum since 2007. This settlement includes a first-century AD palace, later destroyed and reduced to a hill-shaped ruin. During the medieval period, a cemetery was created in the demolition level of this palace. Radiocarbon dating reveals a funerary occupation between the eighth to the fourteenth century. Burials were mainly individual with a uniform typology and follow the same orientation as the structure of the Palace, and excavations highlighted a concentration of seven burials at the center of the Palace. The particular layout suggests a funerary layout from the center to the periphery, and this (according to social status, age-at-death, sanitary state, sex ...)

is the basis of our paleobiological study. The sample represents 21 individuals (17 adults, 4 juveniles). The central group covers a largest number of pathological conditions and one of the most significant results of the paleobiological analysis is a case of leprosy. Although the presence of this infection in that particular region was known, paleopathological cases remain particularly scarce in medieval Sudan.

Ardelean, Ciprian (University of Zacatecas, Mexico)

[140] *New Indicators of a "(Much) Older-Than-Clovis" Cultural Presence at Chiquihuite Cave Archaeological Site in Zacatecas, Mexico*

The systematic search for ancient human presence in the Zacatecas semi-desert of central-northern Mexico continued with new field explorations and excavations during 2016. A new season at the Chiquihuite Cave was meant to verify the weak signals of older-than-Clovis human presence obtained a few years ago. The new extended excavation inside the high-altitude cave revealed two old, clearly differentiated cultural components that had not been acknowledged before. The upper component is clearly laid upon a well-defined occupation floor far away from the entrance, next to the rear walls of the main chamber. It consists mainly of a relatively rich lithic assemblage, while the study of other proxies is under way. It is true that several questions must be made about the assemblage, especially due to its raw material and the technological attributes, but its cultural origin is self-evident. Multiple radiocarbon dates yielded matching results of an age much older than 14,000 cal BP. Another component, much weaker in its characteristics, seems to exist below the upper one, manifested as cultural finds distributed vertically to a considerable depth. Several radiocarbon results suggest an apparent age for the oldest cultural presence going beyond currently accepted dates.

Ardren, Traci (University of Miami)

[5] *Chair*

Ardren, Traci [329] see Dine, Harper

Arendt, Beatrix [365] see Hacker, Stephanie

Argüelles Echevarría, Amaranta [225] see Elizalde Mendez, Israel

Arieta Baizabal, Virginia (Universidad Veracruzana) and Ann Cyphers (Instituto de Investigaciones Antropológicas)

[10] *Densidad poblacional y sus implicaciones socio-económicas en la primera capital olmeca de San Lorenzo, Veracruz*

En los últimos años, los análisis de densidad poblacional y distribución espacial conforman un tema medular en torno al desarrollo de las sociedades, ya que la forma en que se distribuye una población humana en el espacio conlleva determinantes efectos en la estructura interna de la sociedad y, viceversa, la interrelación de los factores económicos, administrativos, políticos y culturales en la sociedad son el reflejo de la organización espacial. El presente cartel muestra los resultados de un estudio que permitió reconstruir el número y tamaño de las estructuras arquitectónicas ubicadas en los diversos sectores del sitio y, a partir de éstos, estimar el número total de pobladores en el asentamiento con el fin de llegar a inferir tendencias en el desarrollo de la primera capital olmeca de San Lorenzo, Veracruz.

Arilla, Maite [389] see Rosell, Jordi

Arjona, Brenda

[19] *Gender and Obsidian Economy in Mesoamerica*

Obsidian tool production in Mesoamerica has been considered primarily the work of men. It is important to examine the roles that women might have had in obsidian crafting. This paper uses results from a study of an obsidian assemblage from an unusual burial excavated at Puerto Escondido, Honduras, to explore the implications of women possibly being involved in stone tool production. In this burial one person was laid out on a bench, wearing an obsidian mirror, in a below-ground chamber, that was then filled with ashes and carbon from incense burning, smashed ceramics, and obsidian tools made from flakes and blades. Analysis of chemical composition using XRF shows that obsidian flakes at the site mainly came from local sources, while blades were imported from centers of specialist production. The use of local obsidian for expedient tools (confirmed through study of residues as used to process plant material) suggests other recorded examples of women making stone tools they use for common tasks. The mixed economy of obsidian at Puerto Escondido, with blades acquired from specialist centers and flake tools made from local material, could correspond to a division between a male gendered specialty and expedient production that included women.

Arksey, Marieka (University of California, Merced)

[204] *Politicized Use of the Spaces outside of Caves during the Terminal Classic Maya Collapse*

This paper investigates the use of caves as performance spaces for water and agriculturally focused rituals during the Maya Late Classic period (~ AD 750–900) and the events of the "collapse." Although the "collapse" of the social, economic, and political systems during this period has been the subject of much study, the majority of research has focused on the environmental factors with little consensus as to how rulers attempted to maintain order, social solidarity, and political power during this time of crisis. Drawing on perspectives grounded in performance theory, ethnography, and traditional archaeology, this paper examines how the use of caves was expanded during the collapse to include the more visible and accessible exteriors of caves for the first and only time in over 2,000 years as rulers attempted to garner favor with the increasingly dissatisfied general populace.

[204] *Chair*

Arkush, Brooke

[339] *Glimpses of Promontory Tradition Settlement Practices and Social Networks: The Ceramic and Faunal Assemblages from Site 10-Oa-275*

The West Fork Rock Creek site (10-Oa-275) is a late prehistoric-aged seasonal camp in southeastern Idaho containing 11 occupational surfaces dating between AD 750 and 1800. Several living floors and nonliving floor deposits contain both Promontory Gray and Great Salt Lake Gray ceramics, along with the butchered remains of bison and pronghorn. This paper explores associations between site occupants and Promontory groups to the south, especially those of the Promontory Peninsula, and considers Promontory and Fremont interactions more generally. Various Promontory groups incorporated eastern Idaho within their home range, perhaps primarily to exploit large-game herds and obsidian sources of the upper Snake River region. The 10-Oa-275 assemblage has improved our understanding of Promontory settlement systems and socioeconomic interactions in areas beyond the Wasatch Front, two important topics that have received sparse attention from previous researchers.

Armada, Lois [324] see Criado-Boado, Felipe

Armijo Torres, Ricardo [349] see Gallegos Gomora, Miriam Judith

Armit, Ian (University of Bradford), Lindsey Büster (University of Bradford), Rick J. Schulting (University of Oxford), Laura Castells Navarro (University of Bradford) and Jo Buckberry (University of Bradford)

[139] *Postmortem Interactions with Human Remains at the Covesea Caves in Northeast Scotland*

As liminal places between the above-ground world of daily experience and the underworld, caves form a persistent focus for human engagements with the supernatural. As such they have frequently been used as places for the dead, whether as final resting places or as places of transformation. Late Bronze Age human remains were recovered from the Sculptor's Cave, on the Moray Firth in northeast Scotland, during the 1920s and 1970s. They suggest the curation and display of human bodies and body parts, associated with wooden structures and a range of objects dominated by small personal ornaments. Recent fieldwork at the nearby Covesea Cave 2 has revealed similar evidence, as have other caves along the same stretch of coast. The Cave 2 assemblage displays evidence for excarnation, trauma, selective redeposition and processing of bodies and body parts. Although individuals appear to have entered the cave whole, certain elements were subsequently removed, while others appear to have been displayed. In this paper we consider the ways in which the Late Bronze Age communities of this region interacted with their dead and consider the role of the Covesea sea caves as a coastal mortuary landscape.

[254] *Discussant*

Armit, Ian [68] see Büster, Lindsey

Armitage, Spencer

[263] *Vertebrate Analysis of Column Samples Taken from Hup'kisakuu7a (93T, DfSh-43)*

Hup'kisakuu7a (93T, DfSh-43) is a small precontact site in Tseshaht territory. This site was excavated in 2015 and 2016 in order to determine to what extent smaller sites in Barkley Sound were being used during the late and mid-Holocene (ca 5000–200 cal BP). Two 2 x 2 m units were excavated. A column sample was taken from the north wall of each unit in 2016. These column samples reached a depth of 120 cm depth below datum (DBD) in unit 1, and 137 cm DBD in unit 2. The sediment recovered was screened through 6.35 mm and 2 mm mesh. In this poster I present vertebrate analysis of the material recovered from these column samples. This analysis was done to determine spatial site use, environmental variability and ensure accurate representations of fauna were recovered from different areas of the site. My findings from Hup'kisakuu7a are then compared to column sample data from three larger sites in Barkley Sound; Hup'kisakuu7a (93T, DfSh-43), Hup'kisakuu7a (93T, DfSh-43), Hup'kisakuu7a (93T, DfSh-43), Kakmakimilh (306T, DfSh-17) and Ts'ishaa (204T DfSi-16). This comparison determines Hup'kisakuu7a has a lower NSP per liter than its larger counterparts.

Armstrong, Alan (Northwestern University)

[317] *Chronological Evidence of Material and Landscape Changes Associated with a Shift in Colonial Control at the Morne Patate Plantation, Dominica*

Morne Patate Plantation in southern Dominica (occupied between the 1740s and 1950s) provides us with an opportunity to examine a setting that underwent major changes in social organization and economic engagements associated with the shift in colonial control of the island from the French to the British in 1763. This paper presents an overview of the chronology of the archaeological contexts at the site and changes in settlement organization. This material record provides evidence for discrete phases of occupation which can be tracked through the changes in the altered landscape and the footprint of the plantation. This study examines changes in chronologically sensitive ceramic assemblages that correlate with modifications in the landscape, and changes in buildings constructed at the site. Morne Patate has two main phases of occupation with distinct patterns of material culture and use of space. This change in settlement organization paired with the site chronology provides an important archaeological context to observe different uses of materials and varying domestic production strategies that occur in separate phases of the plantations occupation.

Armstrong, Chelsey Geralda

[77] *Unique Ecologies of British Columbia*

It is widely understood that humans have varying degrees of influence on a wide range of ecological patterns and processes. In British Columbia an array of landscape management practices have been documented among Indigenous communities resulting in novel ecosystems. Yet, little is known about the range and extent of these eco-human dynamics in pre-settler colonial contexts. We explore the concept of "unique ecologies" as a way of better understanding the untold past of ecological and cultural factors that result in the landscapes we see today. We define unique ecologies as anthropogenically managed landscapes that support the succession and maintenance of culturally important plants including, crab-apple (*Malus fusca*), black hawthorn (*Crataegus douglasii*), hazelnut (*Corylus cornuta*), red elderberry (*Sambucus racemosa*), and dominant sub-canopies surrounded by important berries, roots and fibers. The association of unique ecologies with significant archaeological habitation sites, such as houses and large processing features, help us document how Indigenous people created equitable climates, fertile forests, and reliable supplies of foods and medicines. The ongoing documentation of unique ecologies in BC expands our understanding of subtle historical social-ecological relationships, while also forming and reifying oral histories and traditions, and offering lessons on how to live well on the land.

[77] *Chair*

Armstrong, Chelsey Geralda [77] see Rodrigues, Antonia

Armstrong Oma, Kristin (University of Stavanger)

[35] *Long Time—Long House: Dwelling with Animals in Scandinavia in Prehistory*

The three-aisled longhouse is one of the most long-lived forms of dwelling-place known from prehistory, with its span from the Early Bronze Age (1500 BCE) until the Viking period (10,000 CE). During some 2,500 years, the architectural outline and form remained surprisingly similar. The three-aisled longhouse is, in terms of human culture (albeit not in geological terms), a *longue durée* institution, a materialization of a particular lived space, where humans and domestic animals lived under the same roof. The aim of this paper is twofold: First, I explore the tenets of this lived space, and its implications in terms of social practice with a particular regard to the life-space shared between humans and animals inside the longhouse. Further, I examine the dynamics between patterns of change in prehistoric societies and the longhouse that endures as a basic building block for the farming household. I use the ontological turn as a framework for thinking through both of these topics. I mainly focus on the archaeological record from early Bronze Age until the Viking period in Rogaland, SW Norway.

Armstrong-Fumero, Fernando (Smith College)
 [280] *Discussant*

Arnauld, Charlotte (CNRS) and Mélanie Forné (associated researcher CNRS)

[125] *Multiscale Diversity in Classic Decorated Pottery in the Hiix Witz kingdom of the Western Maya Lowlands*

A political entity defined mainly on epigraphic evidence, the Hiix Witz kingdom includes at least three head centers, Zapote Bobal, El Pajalar and La Joyanca, all located south of the San Pedro Mártir River. The architecture, sculpture and ceramics of the three sites were subjected to extensive studies from 1999 to 2006, also in 2012, suggesting that this entity consisted of relatively heterogeneous components that must have entertained distinct relations with neighboring regions of the West-Central Petén Zone. The goal of this study is to assess the subregional (Hiix Witz) and intersite (the three centers) diversity in service polychrome types and decorative modes of domestic ceramics. Correlating this diversity with possible population movements, trade routes, market networks, and fluctuating political relationships with surrounding polities may open new ways for the identification of major Classic players in West-Central Petén politics.

Arneborg, Jette [32] see Dugmore, Andrew

Arnett, Chris (University of British Columbia.)

[175] *Method and Theory in the Archaeology of Interior Salish Rock Art Sites on the British Columbia Plateau.*

Interior Salish rock art sites on the British Columbia Plateau are multicomponent assemblages which include the geomorphology, the rock art and other surface and subsurface elements such as trails, manuports, petroforms, hearths, lithics, radiocarbon dates, flora and fauna. Defining the interrelationships of these components is essential to understanding the site formation process. In addition, direct historical and cultural continuity between these sites and Interior Salish descendant communities allows conventional archaeological methods to combine with intergenerational knowledge of place and time (indigenous theory) to give finer resolution to the interpretation of site activities.

[334] *Chair*

Arnett, Chris [334] see Angelbeck, Bill

Arnn, Anna (Hamilton College), Nathan Goodale (Hamilton College), Alissa Nauman (Hamilton College) and Bruce Wegter (Hamilton College)

[343] *Ea-IRMS and the Isotope Ecology from Faunal Remains at the Slocan Narrows Site, Upper Columbia River Area, Interior Pacific Northwest*
 Isotope ecological signatures can add to the overall understanding of terrestrial and aquatic species' diets that are present at an archaeological site. In this paper we analyze fauna specimens from across the breadth of species found at the Slocan Narrows site, an aboriginal pithouse village occupied from 3,100 cal BP to the late eighteenth century in the Upper Columbia River area of the interior Pacific Northwest. We utilize EA-IRMS to measure δN , δC , and δO isotope ratios to obtain an understanding of the dietary ecological landscape of the local habitat at Slocan Narrows. Fauna specimens used in this study come from well documented pithouses dating to 1065 cal BP, 533 cal BP, and 405 cal BP, providing a temporal examination of the isotope ecology of the site through the later phases of the village occupation.

Arnold, Bettina (U. of Wisconsin-Milwaukee)

[324] *"And Make Some Other Man Our King": Mortuary Evidence for Labile Elite Power Structures in Early Iron Age Europe*

"... we have been set free . . . by our most tireless prince, King and lord, the lord Robert . . . Yet if he should give up what he has begun, seeking to make us or our kingdom subject to the King of England or the English, we should exert ourselves at once to drive him out as our enemy . . . and make some other man who was well able to defend us our King" (Declaration of Arbroath April 6, 1320). The Romans in first-century BC Gaul and the English in fourteenth-century AD Scotland described the political structures of the Celtic-speaking European peoples they encountered as chaotic and decentralized. Historians and archaeologists have tended to represent such sociopolitical lability as a weakness in the struggle of indigenous peoples against the often superior military strength of highly centralized and hierarchical state-level societies. Based on the evidence for secondary elites, the pates rather than the primus, a case study drawn from the mortuary record of early Iron Age southwest Germany demonstrates that the political structures characteristic of such tribal states were both fluid and highly stable. Built on a foundation of heterarchical relationships, they have proved extremely resistant to millennia of external imperialist pressure.

Arnold, Dean (Field Museum)

[216] *Finding Prehistoric Sources of Ceramic Raw Materials in Ticul, Yucatán, Mexico: Traditional Knowledge, Materiality, and Religion*

Up until the tourist market and piped water forever changed the practice of making pottery in Ticul, potters' raw materials came from sources in a unique socially perceived and spatially restricted landscape that served them well for at least a thousand years. Revealed by ethnographic research, potters' traditional knowledge and utilization of these sources indicated that the unique sources of potters' clay, palygorskite, and pottery temper were ancient and dated to the Terminal Classic Period. Although potters no longer associate any religious meaning with these sources, ethnographic research since 1965, and comparative ethnographic and archaeological data indicate that each of these sources probably had religious meaning for the potters in the past. These sources and the materials that come from them were materialized, distilled, and encapsulated in the required use of pottery for properly performing the annual Day of the Dead ceremonies when the spirits of the dead ancestors return from the earth to the land of the living.

Arnold, T. Elliott [229] see Eusebio, Michelle

Arnsen, Gary [365] see McRae, Ryan

Arranz Otaegui, Amaia (University of Copenhagen), Ana Polo-Díaz (Department of Geography, Prehistory and Archaeology) and Tobias Richter (Department of Cross-Cultural studies and Regional)

[275] *Dung Use before Animal Domestication in Southwest Asia: Evidence from Early Natufian Shubayqa 1 (Northeastern Jordan)*

In southwest Asia the use of dung as fuel has so far only been attested at agricultural sites, which relied on the exploitation of domesticated plants and animals. In this presentation we report the first evidence for dung use by hunter-gatherers in southwest Asia 15,000 years ago. Charred dung remains were found inside two stone-made hearth structures at the late Epi-Paleolithic Natufian site Shubayqa 1. This evidence suggests that dung was recurrently gathered and used as fuel. The macro- and microscopic analyses of the dung pellets suggest that they probably derived from ovicaprids (like

sheep), or alternatively, gazelle. In addition to dung pellets, fragments made of a mixture of dung and grasses were found, which may represent the remains of “dung cakes” or parts of compacted floors from penned areas. This suggests that raw dung may have been processed for the purpose of burning. The wood charcoal analyses from the two hearths indicate that the tree cover at the time of occupation was scarce. We therefore propose that at Shubayqa 1, dung was probably used as a supplementary fuel resource. Overall, these finds suggest that the use of certain animal by-products predates the appearance of domesticated animals in southwest Asia.

Arreola, David [288] see Garcia Chavez, Raul E.

Arriaza, Bernardo [143] see Watson, James

Arroyo, Barbara (Museo Popol Vuh UFM Guatemala)

[182] *New Perspectives on the Maya Highland Site of Kaminaljuyu, Guatemala*

Recent data has been unearthed on Kaminaljuyu during the last five years. Despite Guatemala City's growth, much information is still under the ground. A continuous program has allowed for the piecing together of various research programs carried out at the site. An effort to integrate most of the research and rescue programs has been done to obtain a comprehensive perspective of the culture history of the site. This paper will present data on recent research, focusing on the significant developments during the Preclassic period and its connections to other sites in the highlands and beyond. New data on the ceramic sequence and chronology, exchange, commoners' roles in the society, hydraulics systems beyond agriculture, environmental impact of Lake Miraflores changes, and others will be presented. A short summary of the relationships with the community will be presented to emphasize the role of present day society for the conservation and protection of the site.

Arroyo, Barbara [81] see Ortiz, Jose Raul

Arroyo-Cabrales, Joaquín (Instituto Nacional de Antropología e Historia) and Eileen Johnson (Museum of Texas Tech University)

[385] *North American Late Pleistocene Bear: Diversity and Resource for Early Peoples*

North America had a large and varied bear diversity (Mammalia, Carnivora, Ursidae) during the late Pleistocene. At least seven species occurred from southern Mexico and Belize north, as far as Alaska and the Yukon, constituting the subfamilies Tremarctinae and Ursinae. Tremarctinae had at least four species: two short-faced bears pertaining to the genus *Arctodus*; the spectacled bear *Tremarctos floridanus*; and an undescribed species, probably within the genus *Arctotherium*. All of which are extinct today. The three ursine species are extant, but their populations and distribution ranges have diminished from the late Pleistocene into the Holocene. The polar bear *Ursus maritimus* now is at high risk for extinction, and the grizzly bear *U. arctos* is threatened. The black bear *U. americanus*, however, is increasing its populations in some areas of its range. Few records of human-bear interaction in the Late Pleistocene are known. Those records are focused on bear being a subsistence resource for early peoples. Primary evidence is based on bone modifications. Their procurement and possible impact that such an interaction had on the diminishing bear diversity, based on the extinction patterns, is explored.

Arroyo-Cabrales, Joaquín [140] see Worthey, Kayla

Arroyo-Kalin, Manuel (Institute of Archaeology, UCL)

[325] *How Many, How Few, How Long: Precolumbian Population Density and Human Impact in Precolumbian Amazonia*

Assessing the landscape impact of past settlement and subsistence systems in space and in time is essential to reconstructing precolumbian land use in the Amazon basin. In this paper we consider archaeological and landscape evidence for past land use by examining the strengths and limitations of archaeological radiocarbon evidence as a proxy for broad demographic patterns in precolumbian Amazonia.

Arteaga Saucedo, Alejandro [179] see Donner, Natalia

Arthur, John (University of South Florida St. Petersburg), Matthew Curtis (UCLA Extension), Susan Kooiman (Michigan State University) and Kathryn Arthur (University of South Florida St. Petersburg)

[21] *Beer, Porridges, and Feasting in the Gamo Region of southern Ethiopia*

Porridges and beer make up a majority of the household diet throughout much of rural Africa and could possibly be some of the earliest foods produced. In Africa, pottery is one of the primary culinary tools used to make both porridges and beer. This ethnoarchaeological and archaeological research explores pottery using use-alteration and morphological analyses from the Gamo of southern Ethiopia to indicate the use of pottery as a culinary tool. Beer and porridges are considered luxury foods among the Gamo and are associated with feasts. Through the combination of ethnoarchaeological and archaeological analyses of Gamo pottery, as well as interviews of living descendants, we are able to determine that large scale feasting was occurring at the original Borada Gamo settlement of Ochollo Mulato. The identification of beer and porridges could lead to deciphering social, economic, and demographic changes in the Gamo region and beyond.

Arthur, Kathryn (USF St. Petersburg)

[274] *Knowing My House: An Indigenous Theory and Practice of Being*

The Gamo, who live in the highlands on the edge of the southern Ethiopian rift valley, are known for their unique and beautiful household architecture. Tourists ogle their oval basket-like grass houses and peer inside for mere minutes hoping to observe some secret moment or practice previously unknown to them. Similarly many archaeologists long to feel beneath their trowels a widespread hard surface indicative of a house floor. We remove the tangible aspects of the home, bit by bit, hoping to discover a preserved moment, day, or life time from the past, as a door to understanding how the house and its materials were interdependent with their residents' activities and identities. In the Gamo way of knowing the world, the entangled entities of humans, homes, and household materials are living beings and as such they all engage and experience the life process together. This article offers an alternative way of knowing and being in the world as a theory for understanding the daily lives of farmers and craft specialists as materialized in and near their homes—an ontology of the house.

[314] *Moderator*

Arthur, Kathryn [21] see Arthur, John

Artz, Joe Alan [342] see Doershuk, John

Ashby, Steve [96] see Muñoz-Rodríguez, Mariana

Asher, Brendon (University of Kansas)

[344] *Gunflints from the Central Plains: Technological Characteristics and Chronological Implications*

The time-sensitive characteristic of gunflints makes them important chronological markers at archaeological sites. This poster reviews gunflints from select sites primarily within the eastern Central Plains that have known dates and well documented histories. Lithic materials, origin of manufacture and method of production, as well as technological characteristics of gunflints are discussed. English, French, and Native made gunflints are considered. Native produced gunflints offer an opportunity to explore the influence of culture contact on material culture change during a dynamic period of trade, interaction, and resultant modifications to traditional chipped stone technologies.

Ashley, Ceri (University of Pretoria)

[161] *Creating the "Imagined Community" of Mapungubwe*

Mapungubwe's influence spread deep into the regional hinterland, drawing in far-flung communities, trade networks and people. The traditional picture of a centripetal economy however has been challenged recently by work at these so called peripheries, indicating unexpected levels of autonomy and material wealth. While the place of these newly explored hinterlands need to be re-theorized and their agency acknowledged, there is danger in swinging the interpretive pendulum too far toward a centrifugal social structure of loosely linked political groupings. In this paper, as a complement to the idea of deterritorialization, I will argue that alongside the uncoupling of hinterland economies from the putative core, there were nevertheless, continued iterations of belonging and community that bound the disparate entities. Drawing on the concept of the 'imagined community' that acts and articulates beyond the proximate, face-to-face contacts of the 'natural' community, I will explore how material culture consumption helped reinforce and maintain this network of ties and belonging.

Ashley, Michael (Codifi, Inc.)

[70] *The Benefits of B Corps for Building Sustainable Social Enterprises in Archaeology*

Within the slender margins of academic archaeology, our funding options are extremely limited. The accepted pathways to sustainability have been institutional support (the academy) or starting a nonprofit. In both cases we all must battle over an ever shrinking grant and philanthropic pool. The alternative is to go for-profit, which has historically meant to become a CRM firm. In the past few years, Benefit corporations (B Corps) have become an international movement for individuals and organizations to build social enterprises who wish to use "business as a force for good." Certified B Corps are held to a higher standard than either nonprofits or academic projects in that they should expressly seek change in the world, conduct business as if people and place mattered, aspire to do no harm and benefit all, and work interdependently and be responsible to each other and future generations: "B Corp is to business what Fair Trade certification is to coffee or USDA Organic certification is to milk." We explore how one startup, Codifi, Inc., made the decision to become a B Corp and if the benefits and limitations of this new pathway for social enterprises is worth the effort (hint: it totally is).

[111] *Discussant*

[37] *Chair*

Ashlock, Phillip (CIRCA/University of Aberdeen)

[394] *Fortifying a Community through Public Archaeology: The Collaboration of Public and Private Organizations to Preserve, Protect, and Promote a Spanish-American War Fort on a South Carolina Sea Island*

In a collaborative partnership among the surrounding community, local government, private nonprofit groups, and professional organizations, the first archaeological investigations involving Phase III data recovery excavations were conducted at Fort Fremont in advance of the development of a local government sponsored interpretive center. Entrenched in a maritime forest along the Port Royal Sound, Fort Fremont is listed on the National Register of Historic Places and enhances the coastal landscape of Saint Helena Island, South Carolina. It is an Endicott Period coastal defense fortification constructed during the Spanish-American War. Throughout its history, the fort has had a complex relationship with the surrounding community. When the fort was garrisoned between 1899 and 1921, there were well-documented conflicts with the surrounding African American community, known as the Gullah people, who occupied the region long before Fort Fremont's construction. Through collaboration with local nonprofit and professional organizations, public archaeology is being used to strengthen ties with local residents and the Gullah community. The archaeological investigations and public outreach based initiatives utilized both social media and conventional means to enhance awareness and support the archaeology and history of Fort Fremont within the local community.

[206] *Discussant*

Asmerom, Yemane [162] see Aquino, Valerie

Astudillo, Fernando J. (Simon Fraser University)

[270] *Colonization of Paradise: Historical Ecology and Archaeology of El Progreso Plantation, Galápagos (1870–1904)*

Colonization of the Galápagos Islands started soon after Ecuadorian separation from the Gran Colombia in 1830. During this decade the Islands were legally claimed by the Republic of Ecuador and colonization projects started. Exploiting concessions were approved to national and international companies. One of these concessions was assigned to Ecuadorian businessmen Manuel J. Cobos and José Monroy to create an agricultural colony on San Cristóbal Island; 1,000 km west from the Ecuadorian coast in the Pacific Ocean. They were able to create and manage an industrial-scale plantation called El Progreso in the highlands of the Island. El Progreso operated for three decades generating significant impacts to both the terrestrial and maritime ecology. In this paper we present what we know about the past social relationships occurring inside the plantation during the second half of the nineteenth century. During the past years we have been integrating the analysis of historical written records and archaeological remains in order to explore the daily life of the plantation owners and the workers in this remote location.

[220] *Chair*

Astudillo, Fernando J. [220] see Wiederick, Brock

Atalay, Sonya (University of Massachusetts Amherst)

[141] *Can Archaeology Help Decolonize the Way Institutions Think? How Community-Based Research Is Transforming the Archaeology Training Toolbox and Educating Institutions*

Community-based research requires systemic shifts within institutions, from the way research is funded, protection of human subjects/IRB reviews, ethical guidelines, and what is legible/valued in tenure and promotion decisions. Some of the most important yet least discussed changes must happen in the classroom, in terms of what and how we teach. For community-based archaeologists, we know that process matters. How we conduct research with community partners is essential. The relationships and trust we build; how we design and carry out projects in a participatory way; and the formats we choose for sharing results often need to be retooled. In this paper I consider these issues in two parts. First, I examine how community-based archaeological research is helping decolonize institutions by introducing new ways of thinking about the goals, processes, and outcomes of research. Second, I consider the skills and training that community-based archaeology requires, and I present my recent encounters and experiments in cultivating literacies and competency in these areas among undergraduate and graduate students. I close by examining our responsibilities as scholars to bring about curricular change in our departments, universities, and professional organizations; including suggestions of next steps for the SAA in this area.

[172] *Discussant*

[172] *Chair*

Atha, Lucy [8] see Woolwine, Lauren

Athenstädt, Jan [296] see Slayton, Emma

Attarian, Christopher [382] see Russell, Glenn

Atwater, Chloe [162] see Winterhalder, Bruce

Aubert, Maxime (Griffith University, Australia)

[178] *The Origin of Human Creativity*

The recent discovery of cave paintings in Sulawesi dating to at least 40,000 years ago has altered our understanding of the origins and spread of the first painting traditions. This suggests that either rock art developed independently in Europe and Southeast Asia at about the same time, or that our species invented this trait prior to its initial expansion from Africa. Here I will discuss the implication of this discovery as well as new evidence from Borneo with the aim to deepen our knowledge of a major turning point in early human prehistory.

Auerbach, Benjamin (University of Tennessee) and Angela Mallard (University of Tennessee)

[287] *Modeling Conditions Necessary to Detect Gene Flow in Humans from Archaeological Contexts*

Gene flow between ancient human groups is difficult to detect. In a closed deme, variance in a morphological trait should decrease over short time periods due to genetic drift. Previous studies have thus regarded increases in within-site trait variance over time as a possible indicator for new genetic variation through flow or the physical movement of individuals. This interpretation depends on archaeological context, as diachronic changes in population variance may also arise from selection, sampling differences, or population structure changes. This study applies genetic cline theory to investigate limitations in modeling changes in trait variance due to flow over three time periods among multiple sites. We fit simulated data based on parameters obtained from archaeological dental metrics to models of genetic isolation and flow. The model for no gene flow is that trait means shift stochastically but do not change, and variances decrease over time. Departures from these conditions argue for gene flow. Changes in trait means occur when gene flow is asymmetric between groups with previously distinct trait means. We show that at least three sites from each temporal horizon are necessary to achieve an unambiguous model fit for gene flow among groups within and between time periods.

Auger, Réginald (CELAT—Université Laval), Adelphine Bonneau (Laboratoires d'archéologie Université Laval), Zocha Houle-Wierzbicki (Anthropologie Université de Montréal) and Geneviève Treyvaud (Eau Terre Environment INRS, Quebec)

[178] *Determination of Burial Locations Using Soil Analyses at the Loyola Plantation in French Guiana, 1668–1763*

Our paper discusses the approach used to determine the location of burials in an equatorial environment where organic preservation is nil. Before using the space of the plantation cemetery to preserve the memory of the enslaved who lived at the plantation we had to demonstrate the extant of the cemetery using soil analyses. Memory of that period is a fleeting souvenir among local residents and we want to use archaeology to address issues with which they are confronted in order for them to appropriate the spirit of the plantation. The Loyola Habitation under Jesuit rule reached nearly 500 enslaved whom toiled at the production of a number of cash crops such as sugar, coffee, indigo, rum, etc. under the supervision of a handful of Jesuit missionaries whose goal was to open reductions in Guarani country. From the cemetery where approximately 1,000 people (Slaves, Amerindians and White land owners) have been interred, our motivation is to make a lasting lieu for a dialogue with history.

Auger, Réginald [178] see Bonneau, Adelphine

Augustine, Jonah (University of Chicago)

[222] *Visually Linking the Ritual and the Quotidian at Tiwanaku, AD 500–1100*

In this paper, I examine ceramic vessels, primarily serving wares, from the site of Tiwanaku, the preeminent city in the Central Andes between AD 500 and 1100, in order to examine the political effects of visual media in the ancient Andes. The paper's empirical focal point is a comparison of ceramics recovered from the monumental core and from a residential sector at Tiwanaku. My analysis is based on both attribute and iconographic data I collected during fieldwork that sought to examine the relationship between the media that were consumed at various locations within Tiwanaku. I found that there was a significant amount of shared iconography depicted on materials excavated within Tiwanaku's monumental core and on materials from the residential complex of Mollo Kontu. Based on this evidence, I argue that these ceramic vessels provided visual links between the large-scale public rituals in the vicinity of the site's monuments and the small-scale rituals and meals of people living outside of the monumental core. These links, in turn, had a political effect on the residents of the city, as they served as reminders of those rituals in which peoples' social statuses and obligations to the broader community were most vividly manifested.

Augustine, Skye [77] see Smith, Nicole

Auld-Thomas, Luke [131] see Canuto, Marcello A.

Aura Tortosa, J. Emili (Universitat de València)

[165] *Walking before Running: Late Paleolithic Regional Dynamics in the Spanish Mediterranean Region Previous to the "Last Big Transition" (17–10 ky cal BP)*

The lapse of time between the end of the Last Glacial Maximum (LGM) and the Holocene 8.2 cold event can be considered as a Long Transition, in which global diachronic changes and regional processes are combined. Between 17–10 ky cal BP important ecological changes (increased temperatures, forestry and presence of some species of herbivores, variations in sea-level and coastline, etc.), techno-economic transformations (abandonment of osseous weapons, active and passive grinding stones related with food processing, economic trends to intensification and diversification, etc.) as well as testimonials configuration of group identities (end of parietal art, changes in personal ornaments and funerary practices). These changes are accompanied by an important continuity in sites occupation, which shows a break on the Mesolithic (ca. 10 ky cal BP), starting a fast cycle that ends with the Neolithic (ca 7.5 ky cal BP), the "last big transition."

Austin, Anne (Stanford)

[149] *Discussant*

Averett, Erin (Creighton University), Derek Counts (University of Wisconsin-Milwaukee), William Caraher (University of North Dakota) and Jody Gordon (Wentworth Institute of Technology)

[37] *From Trench to Tablet: Field Recording, Interpreting, and Publishing in the Age of Digital Archaeology*

Since the arrival of robust mobile tablet devices in 2010, archaeological documentation has increasingly become born-digital. The adoption of digital tools and practices has not gone unnoticed, with reactions ranging from enthusiastic acceptance to outright skepticism. Significantly, scholars are beginning to offer more critical and reflexive views of the issues surrounding the use of mobile devices in archaeological fieldwork, interpretation, and dissemination. The ability to disseminate digital data directly from connected devices to a global audience threatens to destabilize traditional standards of archaeological documentation practices, which, in part, used media to define the stages of knowledge production: handmade, paper documents defined the provisional character of field documentation, and the printed, bound, publication marked definitive results. Digital media blurs these distinctions by making trench side data indistinguishable from its final form. By drawing on examples from current archaeological publication schemes, this paper will show how new digital tools and techniques can highlight the potential for mobile computing in archaeology, but also demonstrate how these new methods will challenge and transform institutions that shape archaeological knowledge.

Avery, Margaret [85] see Faith, Tyler

Awayda, Conner and Leslie Aragon

[303] *Site Analysis and Excavation of the Gila River Farm Site in Cliff, New Mexico*

Archaeology Southwest and the University of Arizona's Upper Gila Preservation Archaeology (UGPA) field school excavations at the Gila River Farm Site (LA 39315) produced interesting results from the 2016 field season. The Gila River Farm Site is a Cliff Phase (A.D. 1300–1450) Salado site located on the first terrace of the Gila River, in southwestern New Mexico. It was recorded by archaeologists in the 1980s but had never been excavated. Although now protected on land owned by the New Mexico Nature Conservancy, the site has been subject to mechanical disturbance associated with agricultural activity as well as looting in the past. Despite this history, test excavations revealed more intact deposits throughout the site than had been anticipated. This poster presents the results from this season's field school and suggests future directions for preservation archaeology at the Gila River Farm Site.

Awe, Jaime

[395] *Exotics for the Gods: Lowland Maya Ritual Consumption of European Goods along a Spanish Colonial Frontier*

As a number of researchers who have focused attention on Maya–Spanish interaction along the Belize colonial frontier have noted, the relationship between these two contrasting cultures was anything but amicable. As a result of this bellicose relationship, few material goods of European origin were traded into frontier settlements. The only exceptions were a few objects that were brought in by overzealous friars as gifts to the "heathen" Maya they sought to convert to their Christian faith. And while ethno-historic reports of the missionizing adventures of Spanish priests provide us with important data on Maya life during the early colonial period, the Spanish entradas provide precious little information about the material goods they gifted to the Maya, and even less about how the Maya utilized these foreign goods. In this paper, I discuss how archaeological discoveries in Belize have been filling this void, and how the evidence suggests that a variety of objects of European origin were ritually decommissioned in sacred places.

Awe, Jaime [81] see Ebert, Claire

Ayers-Rigsby, Sara (EBI Consulting)

[291] *Discussant*

Azar, Madelaine

[283] *Quantifying Variation in Ramey Incised Motifs: A Stylistic Evaluation of Cahokian Authority across the American Bottom*

Ramey Incised jars, often considered to be indicative of Cahokia's twelfth-century Stirling Phase florescence, are characterized by angular shoulders, polished exteriors, and incised symbolic motifs arranged around the vessel orifice. Thought to be for ritual or symbolic use, the ceramic type is not only present at Cahokia, but ubiquitous across sites in the American Bottom. However, the process through which these vessels were manufactured and then disseminated is still not fully understood. An evaluation of temporal and spatial variation in Ramey Incised motifs throughout the American Bottom was conducted in order to better understand levels of standardization, elite control, and Cahokian influence involved in the production and distribution of Ramey Incised ceramics. Motif data indicate that the Ramey Incised manufacturing process was not likely concentrated within one central site. Many Ramey Incised vessels may have been created at the site from which they originate. The results may also suggest the existence of stylistic and political autonomy, as well as cultural diversity, among many of Cahokia's satellite settlements. Contrary to proposed models of far-reaching, hierarchical Cahokian authority, American Bottom social organization during the twelfth century may be better understood in terms of a decentralized heterarchy.

Aziz, Nasullah [180] see Ono, Rintaro

Babajanyan, Astghik [221] see Franklin, Kathryn

Babala, Peter and Joseph Reti (University of California, Santa Cruz)

[303] *Subconscious Expressions of Identity in Migrant Communities: A Look at Lithic Debitage*

Subconscious expressions of cultural identity can be found in low-visibility attributes of every-day processes such as lithic production. In the late thirteenth century, Kayenta migrants into the southwestern New Mexico maintained or adapted many archaeologically visible traditions. This research examines lithic debitage assemblage morphology and attributes from three archaeological settings: southwestern New Mexican sites, Kayenta sites, and Salado sites (representing post-migration communities) during the thirteenth and fourteenth centuries to identify potential patterns of continuity and adaptation among the migrant communities. Previous research has demonstrated continuity in Kayenta traditions in Salado communities in the form of home and ceremonial structures, ceramic production and stylistic patterns, and in projectile point style. As Kayenta populations migrated in new regions, lithic production patterns changed when they were introduced to new raw material and went from having primarily chert resources to having access to abundant obsidian nodules. This research hypothesizes that low visibility attributes in the form of lithic debitage will demonstrate continuity in lithic production patterns as this migrant community engages with local raw materials.

Backhouse, Paul (Seminole Tribe of Florida)

[1] *Discussant*

Bader, Alyssa (Department of Anthropology, University of Illinois at Urbana-Champaign), Julie M. Allen (Illinois Natural History Survey, University of Ill) and Ripan Malhi (Department of Anthropology and Carl R. Woese Institute)

[176] *Metagenomic Analysis of Precontact Diet Using Ancient Dental Calculus from Prince Rupert Harbour, British Columbia*

Prior to the displacement caused by European colonization, the Coast Tsimshian harvested an array of terrestrial, freshwater, and marine dietary resources as they moved between coastal settlements and the nearby Skeena River valley. Conventional paleodietary analysis using faunal analysis and isotopic values has provided valuable data which, when paired with the knowledge of First Nations communities, can help reconstruct how ancestral communities utilized food resources prior to the cultural disruption caused by European contact. However, these methods of analysis are limited in their ability to pair the consumption of specific species with specific individuals, potentially resulting in an incomplete analysis of how individuals in these communities interacted with their environment. Building on previous archaeological analyses, this paper will present the results of a metagenomic study which used next-generation DNA sequencing methods to identify plant and animal DNA preserved in the dental calculus of ancient human remains from several sites across the Prince Rupert Harbour area. The results of this study provide an exciting new lens through which to examine traditional resource use and food-related culture within the ancient communities of the Prince Rupert Harbour area waterways.

Badger, Emily (University of Victoria) and Ryan Schucroft (University of Victoria)

[263] *Monuments in Danger? Study Done in the Jewish Cemetery of Victoria, British Columbia*

Monument preservation is an important part of remembering loved ones. Because of the wide variety of stones and manufacturing techniques, there are many factors that may contribute to monument decay. Each factor should be assessed and measures taken to prevent further degradation. For this project, we attempted to determine what factors could be at play when looking at headstone deterioration at the Emanu-el Jewish cemetery. We considered four hypotheses: first, monuments under tree cover would be in better condition than those from the same time that were under open sky. Second, upright headstones would be in better condition than those that were flat. Third, monuments closer to the ground would be in worse condition than those raised up out of grass and dirt allowing for organic growth. Finally, unpolished headstones would be in worse condition than polished headstones. As each of our hypotheses were examined, extra factors came into play that we had not foreseen (e.g., organic matter decomposing on flat monuments). We concluded that where some hypotheses were easily proven, others had complications that could be looked into in further studies.

Badillo, Alex E. (Indiana University)

[137] *Narratives of Quiechapa in Light of Material Evidence from Survey*

Our knowledge of the prehispanic past of Quiechapa and the surrounding regions has been largely based on a combination of historic sources, modern day linguistic classification, and previous archaeological work in nearby regions. El Proyecto Arqueológico de Quiechapa (PAQuie) recently completed a 99 sq. km pedestrian survey of the Quiechapa region in the Sierra Sur of Oaxaca, Mexico. In this talk, I discuss major findings from the survey in the Quiechapa region within the context of broader narratives of prehispanic southern Mexico. I combine spatial analysis of archaeological sites and architectural features with analysis of ceramic and lithic materials in order to compare and contrast the material evidence from specific sites with current narratives. I address the occupation history of the region as well as Zapotec military presence based on the initial pedestrian survey. Finally, I discuss directions for future investigations.

[137] *Chair*

Badillo, Alex E. [137] see Estes, Aaron

Badillo Sánchez, Alejandra (CRAS Project/CIESAS-Peninsular Doctorado en Historia)

[280] *Indicios de poder, la estrategia de control de la guerra de castas: Arqueológica e historia de la posición de la fuerzas armadas porfirianas en la Campaña militar de Yucatán de 1899–1901.*

En el contexto de la última época de la guerra de castas. El gobierno de Porfirio Díaz manda a construir un sistema de fuertes en la zona centro oriental del estado de Yucatán, con el objetivo de tomar el control del territorio que por más de cuarenta años había estado dominado por los mayas “rebeldes.” Excavaciones realizadas, así como recorridos en la zona revelan la planeación, ubicación y arquitectura de puestos militares, los cuales sugieren por una parte la estrategia del gobierno para llevar a cabo la ocupación de la región, y por otra parte y el grado de peligrosidad que percibían las autoridades frente a los mayas conedores de la zona. La evidencia arqueológica de la guerra en conjunto con documentos históricos apoyan a reconstruir la política de reducción y los cuatro distintos frentes de operación por mar y tierra que planeó el gobierno de Díaz para retomar la soberanía del territorio de los mayas.

Baeteman, Cecile [356] see Bogemans, Frieda

Bailey, David G. [50] see Buff, Lindsay

Bain, Allison (Université Laval, Québec, Canada) and Mélanie Rousseau (Université Laval, Québec, Canada)

[285] *Hitchhiking to the New World: Archaeoentomology and the Study of Introduced Insect and Ectoparasite Species.*

This paper presents an overview of North American archaeoentomology, focusing on the study of introduced species. Seminal works on the introduction of plant and animal species during colonization suggested multiple parameters allowing for the colonization of the Americas by Old World species (Lindroth 1957) and introduced the term “European biological imperialism” (sensu Crosby 1972) to our vocabularies in environmental archaeology. Research in archaeoentomology, focusing primarily on beetles and ectoparasites found in archaeological contexts, has permitted the documentation of species introduction and dispersal in the New World during the Colonial Period (fifteenth–eighteenth centuries). While plant species and seed crops were imported intentionally, insects and ectoparasites were almost always hitchhikers, unintentionally imported during colonization. Recent archaeoentomological research suggests the early and intensive occupation of suitable ecological niches by Old World species (Bain and King 2011) however, small and relatively modest datasets have limited our understanding of the displacement of native species. Case studies will be presented from sites in Newfoundland, Quebec City, Boston and Virginia. These studies suggest that colonists continued to combat Old World pest and ectoparasites species here in the New World as they re-created European niches through settlement practices.

Baines, Kristina [162] see Zarger, Rebecca

Bair, Andrew [282] see Connell, Samuel

Baires, Sarah

[242] *The Politics of Urbanization and the Anthropocene: a View from Cahokia*

Anthropocene: a hotly debated geological epoch entangled with climate change, the Industrial Revolution, and the perceived deleterious effect of humans on the natural world. A dialectic surrounds the Anthropocene because identifying this epoch, geologically, has real implications for global politics and the future of humanity in a changing global environment. Crossland (2014) suggests that to understand the palimpsest of global human action that resulted in the Anthropocene requires us to consider a broader network of relational events that move beyond the Industrialized West. This necessitates a reorientation from a human-centric view of the world to one that considers human and other-than-human relations. Archaeology is uniquely situated to examine the Anthropocene; we are concerned with the multi-scalar interactions of humans with the natural world. In this paper, I examine the concept of urbanism at Cahokia, a precolumbian North American city, and its relationships with the Anthropocene. I discuss the implications for and results of ‘city-life’ that have had unique impacts on the global environment (e.g., excess garbage, modifying the natural environment, development of agriculture). My data concerns the construction of monumental earthworks and neighborhoods with the natural environment and their impact on the environment.

Baires, Sarah [283] see Baltus, Melissa

Baitzel, Sarah (Washington University in St. Louis)

[202] *A View from the Past: A Reanalysis of Archaeological Collections from the Sama Valley and Its Implications for Current Models and Chronologies of the Southern Andean Valleys*

Although limited in area compared to the neighboring Moquegua, Caplina, and Azapa valleys, the Sama valley (Departamento Tacna, Peru) with its warm temperature, perennial water sources and arable flood plain creates hospitable conditions for highlanders who settled the valley as early as Late Horizon period. In his 1567 visita, Garci Diez de San Miguel notes the presence of a Luqapa colony and an Inca Tambo at the site of Sama Grande near the modern town of Sama-Inclan. In addition, survey and test excavations by German and Peruvian archaeologists under the direction of Hermann Trimborn between 1972 and 1975 registered Formative, Middle Horizon, and Late Intermediate period sites throughout the valley. In this paper I present the results of a reanalysis of materials collected by Trimborn and his collaborators. The goal is to compare the original project notes and artifacts with current ceramic chronologies for this region, and to reevaluate past and present interpretations and models related to presence of highland populations in the Western coastal valleys of the southern Andes.

Baker, Brenda (Arizona State University)

[219] *Mortuary Variability and Identity Upstream of the Fourth Cataract*

Fieldwork upstream of the Fourth Cataract in northern Sudan reveals substantial variation in mortuary practices among roughly contemporaneous sites on both local and regional levels. Cemeteries in the Bioarchaeology of Nubia Expedition (BONE) concession on the right (north) bank of the Nile River near el-Qinefab include intervisible clusters of graves from the Kerma period (c. 2500–1500 BC) and into the subsequent period of Egyptian colonization of Nubia. These sites constitute a mortuary landscape on the desert terrace distinct from mortuary activity in the Meroitic (c. 350 B.C.-350 AD) through Christian (c. AD 550–1400) periods that is confined to the floodplain. Grave architecture and treatment of the dead in this presumed hinterland show inclusion of imported grave goods in all periods that indicate integration into extensive trade networks rather than marginalization from state-level core areas. Identities among those interred in the desert cemeteries may be reflected by grave styles and burial treatment, including presence or absence of ceramic vessels or imported objects, or inclusions that may reflect activities conducted during life (e.g., a bone implement likely used in pottery production) or more subsistence strategies. This research advances our understanding of ancient Nubian social organization, identity, and interaction.

Baker, Jack [8] see Kieffer, C. L.

Baker, Kristen

[41] *World War II Battlefield Archaeology of Tarawa*

A central tenant of military philosophy is “adapt, improvise, and overcome.” Navigating battlefields requires constant adaptation to dynamic surroundings due to the interplay of several variables such as 1) preexisting landscape and terrain, 2) enemy defenses, 3) enemy opposing forces, and 4) friendly and enemy fire. To successfully navigate the archaeology of a historic or prehistoric battlefield, archaeologists must attempt to understand the variables (such as those listed) that contributed to their battlefield of interest and be willing to constantly adapt their search and recovery strategy to their findings. This presentation will detail the archaeological methods employed by History Flight specifically for battlefield archaeological purposes, and the corresponding findings that resulted from search and recovery activity in the World War II battle site of Tarawa that occurred in what is now the Republic of Kiribati, Tarawa, Betio Island. From 20 to 23 November 1943, the battle of Tarawa resulted in the loss roughly 1,200 U.S. service men and

approximately 5,500+ Japanese military and Korean laborers. While the historical record details much of the events that occurred, careful forensic and battlefield archaeology has brought to light data that in some cases contradicts and in others cases confirms the historical record.

Bakhtiary, Roshanne (U.C. Davis), Rosemary Cambra (Chairwoman of the Muwekma Ohlone Tribe of SF Bay) and Alan Leventhal (Department of Anthropology, SJSU)

[381] *Stable Isotope Evidence of Seasonal Shellfish Harvesting and Consumption in Prehistoric Central California*

Shellfish played an important role in the diet of prehistoric hunter-gatherers of Central California. They were the dominant visible component in the large shell mounds that once lined the San Francisco Bay shoreline. Although Bay shellfish are present at inland sites as well, little is known about the role of shellfish in the diet and lifeways of interior populations that hauled the resource in from the Bay. This study focuses on findings from CA-SCL-330, an inland Late Period site in the Diablo Range excavated by the University of California, Davis Field School in the summer of 2016. By looking at stable oxygen isotopic signatures found in the growth rings of certain mollusk species, we can estimate the season of harvest for shellfish brought to this site. Data on individual diet can further characterize consumption patterns of a marginal resource like shellfish and open pathways of inquiry into broader behavioral and social implications including the division of labor by sex and the emergence of status differentiation.

Bakke, Gwen (Southern Methodist University) and Karen Lupo (Southern Methodist University)

[85] *What Predicts Cutmark Frequency and Intensity?*

The presence and abundance of cutmarks in zooarchaeological assemblages are often used to infer carcass acquisition strategies, butchery patterns and the general availability of prey. In this paper we analyze cutmark data derived from three hunter-gatherer ethnoarchaeological assemblages (East African Hadza, Central African Bofi and Aka and Paraguayan Aché) to investigate how well carcass-size and distribution of meat predict cutmark frequencies as measured by conventional measures such as %NISP and %MNE, and cutmark intensity (the number of marks per bone). We also examine how well other factors such as the number of consumers and food sharing influence these measures.

Bakken, Rikka [341] see Hoffman, Brian

Balázs, Ádám [196] see Duffy, Paul R.

Balcarcel, AnaBeatriz (Mirador Basin/FARES Foundation), Edgar Suyuc-Ley (Mirador Basin/FARES), Richard Hansen (University of Utah, FARES Foundation), Francisco López (Mirador Basin) and Josué García (Miador Basin)

[337] *New Perspectives from the Late Preclassic Period in the Mirador-Calakmul Basin*

The Late Preclassic period (350 BC–AD 150) in the Mirador-Calakmul Basin is characterized by innovations in various aspects of ancient Maya society which are the reflections of a complex ideological, sociopolitical, and economic power. These ingredients were responsible for the conception and creation of large and diverse works of architecture and engineering achievements. This paper will discuss the importance of the Late Preclassic period in El Mirador and contemporary cities within the Basin system as an evolutionary process, and the data provide a reflection of the sovereignty radiated during the Preclassic period within the Basin and other surrounding cities.

Balco, William (University of North Georgia)

[103] *Excavating the Yahoola High Trestle: Spanning Past and Present in Dahlonga, Georgia*

Archival research and subsequent test excavations at the site where the Yahoola High Trestle once stood in Dahlonga, Georgia, has explored the construction, use, and abandonment of an important component of America's first gold rush. This structure supplied high-pressure water to hydraulic mining operations in the area, facilitating sophisticated mining techniques to extract gold from the surrounding landscape. This paper presents the results of archival research and archaeological testing conducted in 2015 and 2016 by student volunteers and members of the local community. The results of these excavations suggest that the trestle was likely not the imposing structure it was originally intended to be and that it was likely disassembled for scrap after it became obsolete. Regardless, the construction and operation of the trestle helped shape the developing economy in rural north Georgia during the mid- to late-nineteenth century.

[103] *Chair*

Baldini, James (University of Durham), Keith M. Prufer (University of New Mexico), Yemane Asmerom (University of New Mexico), Franziska Lechleitner (ETH Zurich) and Sebastian Breitenbach (Ruhr-University Bochum)

[162] *Identifying the Drivers of Central American Rainfall Shifts: Implications for Past, Present, and Future Human Behavior*

Yok Balum Cave's location at the northernmost extent of the Intertropical Convergence Zone (ITCZ) combined with its abundance of aragonitic stalagmites makes the site an exceptional archive of paleoclimatic information. Additionally, Yok Balum Cave is located at the heart of the Maya Lowlands, and speleothem-based paleoclimate records from the site can provide invaluable information for archaeological research. Although the Yok Balum record and most other regional climate records strongly suggest that the fragmentation of the Classic Maya Civilization was contemporaneous with a series of decadal-scale droughts, the cause of these droughts remains enigmatic. A suite of geochemical records from Yok Balum Cave stalagmites imply that the ITCZ migrated southward at that time, but this behavior is inconsistent with elevated Northern Hemisphere temperatures thought to characterize the Medieval Climate Anomaly. The solution to this paradox likely involves the complex interplay between solar activity, explosive volcanism, and the North Atlantic climate state. Furthermore, reconstructions spanning the last 500 years identify modern industrial activity as a driver of southward ITCZ migration. Considered together, the records from Yok Balum provide an excellent example of how climate change affected past civilizations and underscore the challenges faced by modern societies.

Ball, Christopher (University of Toronto)

[371] *Reassessing Perspectives on Environmental Management in Southern Ontario*

Archaeologists in southern Ontario have taken up a number of diverse perspectives for coming to an understanding of past human-environmental dynamics. While these disparate perspectives all produce something of value and contribute to the bigger picture of human-environmental relationships in the region there has been little work done in synthesizing their contributions or consolidating said perspectives into something more cohesive. This discussion is therefore focused largely on the consideration of paleoethnobotanical work in southern Ontario ranging from strict archaeobotanical reporting to the search for the origins of agriculture and ultimately to current trends observed in the shift toward more synthetic historical ecology or niche-construction based theoretical perspectives. This discussion will argue that while current trends have been almost entirely positive for our understanding of past human-environmental relationships, with special attention to the benefit of their application in southern Ontario, there is still considerable room for improvement as we strive to approach a more holistic, and nuanced view of this critically important dynamic of past societies.

Ball, Joseph (San Diego State)
 [125] *Discussant*

Ballester, Benjamín (Université Paris 1 Panthéon-Sorbonne), Marcela Sepúlveda (Universidad de Tarapacá, Instituto de Alta Investi), Francisco Gallardo (Pontificia Universidad Católica de Chile-ICIS), Gloria Cabello (ICIS) and Estefania P. Vidal Montero (University of Chicago)

[216] *Pigment Mining for Color Meanings: El Condor Mine from Atacama Desert (AD 300–1500)*

The mineralogical richness of the Atacama Desert allowed for the development of an important set of mining-extracting and metallurgic, lapidary and pigmental productive activities, which became significant activities in the sociocultural dynamics of desert dwellers. El Cónдор mine, an important hematite source located in the middle section of the Loa River, was exploited from the Formative Period (~AD 300) until Inka times (~AD 1500). In contrast to other mining sites in Atacama, El Cónдор presents a variety of activity areas: extraction pits, processing areas with multiple anvils and grinding tools, semicircular structures, and combustion zones—in addition to large dispersion of red powder spread across its surface. The production was initially developed as a craft, intensifying during later periods (since ~AD 1200) due to the increase in pigment values and the scale of consumption at regional and also supra-regional levels. El Cónдор mine constitutes an interesting example of a large-scale hematite operation because it articulated important exchange and relationship networks, and also serves as a relevant case for evaluating and discussing local miners negotiations during the productive reorganization after the Inka expansion to the region.

Ballester, Benjamín [134] see Vidal Montero, Estefania P.

Balme, Jane [173] see Langley, Michelle

Balos, Angelica [294] see Lucas, Virginia

Baltus, Melissa (University of Toledo) and Sarah Baires (Eastern Connecticut State University)

[283] *Building below the Surface: Earth Moving and Caching at Cahokia's CABB Tract*

Human engagement with the world includes forging and maintaining relationships with social agents, both visible and invisible. Among Native North Americans, these relationships are simultaneously religious, social, and political. We explore these relationships using data from our 2016 excavations at Cahokia's CABB (Courtyard Area Between Borrows) Tract, located southeast of Woodhenge and west of the Grand Plaza. The CABB Tract is situated north of two known borrow pits (Fowler's 5–5 and 5–6) and includes an additional, previously unidentified borrow pit. Using evidence resulting from our limited excavations and geomorphology cores, we examine how Cahokians engaged with the natural and the supernatural through earth-moving activities while contributing to the construction of the urban landscape. We explore the "doings" (after Fowles 2013) of building and shaping the landscape through the borrowing of earth, creation of low spaces, and layering of soils and special materials as a means of engaging with and relating to other social agents. Additionally, we consider practices of re-excavation into special buildings and deposits of pottery in borrow pits and buildings in this area of Cahokia to demonstrate the ways in which the supernatural intersects with daily life.

Bamford, Bree (University of Victoria)

[263] *Preliminary Vertebrate Faunal Analysis of Hup'kisakuu7a (93T): Results from 2015 and 2016 Excavations*

Excavations conducted at the site of Hup'kisakuu7a (93T), in partnership with the Tseshaht First Nation, unearthed a variety of fauna that merit zooarchaeological analysis. Unlike the major ancient village sites previously excavated, such as Ts'ishaa and Huu7ii, the shallow shell midden of 93T is representative of a small-scale site, potentially occupied over a long period of time, comparable to that of the aforementioned major sites. The faunal assemblage is small in comparison to those of major village sites and differs notably in its consequent composition. Data from two separate excavation seasons have been quantified by weight, number of specimens and volume excavated per cubic meter. The datasets have been integrated to assess intrasite temporal and taphonomic trends, as well as intersite variation. Analysis reveals discernible intrasite variation that is consistent with house floor deposits and associated midden refuse. Intersite comparisons indicate that the characteristics of Hup'kisakuu7a are unique and provide context within a larger archaeological understanding of subsistence practices in Barkley Sound. These results contribute to the ancient and continuous cultural history of the Tseshaht in the Broken Group Islands of Barkley Sound.

Bamforth, Douglas

[332] *Discussant*

Barnard, Hans [309] see Jones, Terrah

Bandeira, Arkley [45] see Colonese, Andre Carlo

Bánffy, Eszter

[95] *Adapting to Harsh Environment Resulting Changes in Culture That Led Toward a New Perception of the Outer World: The Birth of the Central European Neolithic*

In the sixth millennium BC, first farmers reached the area between south east and central Europe, soon spreading into central Europe. About the character and identity of these first farmers at the boundary area, a series of new research results is available. At the boundary, harsh environmental conditions made their long well-working subsistence system unstable, as the 'package' of farming and mainly sheep and shifted to cattle keeping. Yet, it has hardly been investigated, what reflections of the changing character of nature and landscape caused in their minds. The paper gives two examples for the perception of the previously unknown, northern natural environment, resulting in changes in cognition. The first one is about settlements amid forested hills. A different perception of social arena evolved, the original clay architecture turned to wooden house structures. The second example focuses on monumental clay figural art: female upper bodies emerging from large podiums are found in domestic contexts. In the northern margins, females turn to horned cattle figures. This shift reflects a growing importance of cattle keeping that permeated in domestic ritual life. The new pattern, different social places created and changes of rituals affected their perception of the natural environment around.

Bankoff, Richard [152] see Hixon, Sean

Banks, Kimball (Metcalf Archaeological Consultants Inc. and Combined Prehistoric Expedition Fdtn), Linda Scott Cummings (PaleoResearch Institute), Signe Snortland (Combined Prehistoric Expedition Foundation) and Maria Gatto (Aswan-Kom Ombo Archaeological Project)
[229] *Turning the Desert Green: Reconstructing Late Paleolithic Vegetation at Wadi Kubbania, Upper Egypt*

Wadi Kubbania is the largest wadi extending from the Western Desert to the Nile in Upper Egypt. The Combined Prehistoric Expedition devoted four seasons in the late 1970s-early 1980s investigating Late Paleolithic (20,000–12,000 BP) settlement-subsistence in the wadi. The Expedition documented one of the most complete occupational sequences for this period in Upper Egypt. Because of excellent preservation, the Expedition was able to reconstruct the vegetation and identify floral resources exploited during the Late Paleolithic. In 2012, the Combined Prehistoric Expedition Foundation in collaboration with the Aswan-Kom Ombo Archaeological Project returned to excavate WK26, which dates to the end of the Late Paleolithic sequence, with the objective of continuing vegetative reconstruction and identifying exploited floral resources, applying recent technology. This paper addresses vegetation during and plant use in the Late Paleolithic and techniques for identifying such resources.

Banks, Paul (Archaeological Society of Jamaica)
[93] *Discussant*

Banning, Edward (University of Toronto)
[191] *Percolation Theory and the Effectiveness of Adaptive Sampling in Subsurface Survey*

Percolation theory, used mainly in physics and materials science, describes the behavior of interconnected clusters in spatial lattices, but is also relevant to an age-old problem in archaeology: how best to detect buried sites with subsurface testing. It can provide insights into adaptive sampling protocols applied to two-dimensional scatters of artifacts. Our research focuses on adaptive sampling's impacts on our understanding of underlying distributions of artifacts and sites in survey by shovel tests, augering, or coring. Does adaptive sampling improve our ability to detect and recognize sites? Does it help us define site's boundaries or estimate their sizes? Or do we risk defining "sites" that are simply a creation of the research method? We evaluate adaptive subsurface sampling and compare it to simple subsurface survey through simulation. This allows us to control for artifact density and clustering, size of artifact clusters, and orientation and spacing of the lattice. We also experiment with different versions of the method, varying, for example, the size or definition of the "neighborhood." The simulations and comparison to predictions based on percolation theory help us evaluate the utility of current survey protocols and to suggest improvements for future work.

[73] *Discussant*

Baquedano, Elizabeth (University College London, Institute of Archaeology)
[288] *Gold (Tumbaga) and Butterfly Symbolism*

When metals were introduced in Mesoamerica ca. AD 850 they were used with both utilitarian and decorative purposes. Copper artifacts were turned into fishing hooks, tweezers, or axes. However, silver and gold were mostly used in jewelry production. Several deities were fashioned in gold as well as animals associated with gods. They included pendants, nose-rings, necklaces, etc. Warriors were also depicted as pendants, and there are examples in discs too. The context where the objects have been found is particularly important. There are good examples of butterflies made to represent fertility goddesses and there are representations of warriors wearing pectorals in the shape of butterflies. This paper will focus on the symbolic importance of butterflies in warfare as well as in agriculture.

[288] *Chair*

Baquedano, Elizabeth [135] see Paris, Elizabeth H.

Barajas Rocha, María [225] see Favila, Mario

Barajas Rocha, Maria [225] see Sanroman, Adriana

Barba, Luis [13] see Mejía Ramón, Andrés

Barba, Luis (Universidad Nacional Autonoma de Mexico), Linda R. Manzanilla (Universidad Nacional Autonoma de Mexico), Agustin Ortiz (Universidad Nacional Autonoma de Mexico) and Alessandra Pecci (Universidad de Barcelona)

[274] *Residue Analysis of Plastered Floors and Function of the Rooms at Teopanazco, Teotihuacán*

Teopanazco is a neighborhood center at Teotihuacán. It was excavated in the framework of the project Teopanazco "Teotihuacán. Elite y Gobierno" directed by Linda R. Manzanilla between 1997 and 2005). Samples from the plastered floors of the compound have been analyzed at the Laboratorio de Prospección Arqueológica of the UNAM (Mexico) in order to understand the chemical enrichments of floors and the spatial distribution of activities. We show here the results of the analyses of the Xolalpan phase of the compound, integrating the information coming from the residue analysis and other archaeological evidence at the site, in order to provide a hypothetical reconstruction of the use of space.

Barber, Sarah (University of Central Florida)
[82] *The Symbolism, Use, and Archaeological Context of Masks in Formative Period Coastal Oaxaca, Mexico*

Mesoamerica has a long tradition of masking, as evidenced by representations of masked individuals, and the masks themselves, extending back to at least the Early Formative period. In the lower Río Verde valley of Oaxaca, evidence for masking exists throughout the precolumbian sequence, from the earliest villages to Postclassic settlements. This evidence often consists of figurines depicting masked individuals or representations on ceramic vessels and carved stones. Recent excavations have also uncovered a small number of masks and mask fragments. In this paper, we focus on the early history of mask production and use during the Formative period (1900 BCE—CE 250). We discuss the symbolism and archaeological context of masks and their representations in other media such as figurines. We suggest that masks played an integral role in communal performances that likely also included music, dance, and oration. A means of bringing together people and the divine, masks in ancient Oaxaca (like masks in Oaxaca today) imply animistic and nagualistic aspects of Mesoamerican cosmology. These ancient masks shared broad similarities with those used elsewhere in Formative period Mesoamerica, including the incorporation of transformative capacities into relations of inequality and authority by the first centuries of the common era.

[82] *Chair*

Barber, Sarah [82] see Joyce, Arthur

Barbier, Brian (University of California, Santa Barbara)

[381] *Beads All the Way Down: Reassessing the Economics of Shell Bead Production on Santa Cruz Island*

Marine shell beads played an important role within broad interregional exchange networks in California for several millennia. Previous scholarship has demonstrated the relationship of shell bead production and exchange to increasing sociopolitical complexity in the Santa Barbara Channel region during the Late Period, ca. 900 BP. However, this relationship is less understood for earlier periods. Additionally, the morphologically-distinct bead types produced during the Late and preceding Middle and Early periods leave different signatures in the archaeological record. Through experimental replication of *Olivella* shell beads, I assess differences in bead production labor rates and debitage signatures for the predominant bead types produced during the Early, Middle, and Late periods. I compare these findings to the bead production patterns at CA-SCRI-236, a site on Santa Cruz Island that was occupied during all three time periods. Results suggest that previous interpretations are inconclusive: socioeconomic complexity as underwritten by bead production may have developed much earlier and may have experienced brief lulls during times of social or environmental stress. Analysis of the long *durée* at one location provides greater insight into the evolution of sociopolitical complexity in the region.

Barcelo, Juan (Universitat Autònoma de Barcelona) and Florencia Del Castillo Bernal (Centro Nacional Patagónico-Conicet)

[286] *The Emergence of Cultural Consensus in Hunter-Gatherers: Toward a Computer Model of Ethnogenesis in the Past*

In this contribution we present the results of a computer simulation of an "artificial society," implemented to understand how cultural identities and cultural standardization may have emerged in a prehistoric hunter-gatherer society as a consequence of restricted cooperation. The aim of the model is to explain how diversity and self-identification may have emerged in the small-scale societies of our prehistoric past. The computer model explores some possible consequences of theoretical assumptions about cooperation, communal hunting and cultural diversity and the process of ethnogenesis. We have not modeled the decision process from the point of view of individuals, but at the level of the population, modeling social dynamics as a set of factors that constrain social actions. The agent does not decide as a rational individual, but probabilities for action at each cycle are taken into account as soon as local conditions change. Computer results are then compared to ethnoarchaeological data from Patagonia to evaluate the explanatory capability of the theoretical model.

Bardolph, Dana (University of California Santa Barbara), Brian Billman (University of North Carolina, Chapel Hill), Jesus Briceno (Ministerio de Cultura, Peru) and Gabriel Prieto (Universidad Nacional de Trujillo)

[222] *Reconsidering Farming and Foraging in the Pre-Moche World*

This paper examines the relationships between food, identity, and social inequality on the Prehispanic Peruvian North Coast through a paleoethnobotanical perspective. We reconstruct household culinary practices to address the roles that food played in the migrant experience of highlanders that settled in a traditionally coastal river valley. This migration occurs just prior to the consolidation of the Southern Moche polity, one of the earliest state polities in the Americas and characterized by unprecedented social stratification. Regional subsistence reconstructions based on primary plant data from large-scale household excavations are now beginning to bear fruit. We consider changes in plant foodways during the Early Intermediate Period (400 BC–AD 1) through a diachronic analysis of macrobotanical data from highland and coastal residential sites in the Moche Valley, to explore how highland-coastal contact, competition and alliance formation, and a broadly changing sociopolitical landscape impacted plant food production at the household level. We aim to show how careful microscale research can complement the current studies of political, economic, and ideological phenomena at larger ceremonial centers, on the Peruvian north coast, in the Andes, and beyond.

Barker, Claire [34] see Fladd, Samantha

Barkwill Love, Lori (University of Texas at San Antonio)

[303] *Revisiting the Mogollon Early Pithouse Period*

The beginning of the Early Pithouse period in the Mogollon region, around AD 200, was marked by a fundamental shift in material culture and lifeways. This major shift included the introduction of ceramics and the construction of more substantial habitation structures as well as communal structures. Yet, relatively speaking, few Early Pithouse period sites have been excavated, and many of the sites that have been excavated were excavated 30 or more years ago. This poster presents new data from existing Early Pithouse period collections as well as the preliminary results of test excavations at Two Boots, an Early Pithouse period site excavated as part of the 2016 UTSA Southwest Archaeology Field School. The implications of these new data on our current understanding of the Early Pithouse period and directions for future research will be discussed.

Barlow, Robert (BAKOTA Project/University of Alabama), Hajnal Szász (Babes-Bolyai University), Györgyi Parditka (University of Michigan) and Paul R. Duffy (University of Toronto)

[196] *Spiraling Like a Boss: Exploring Elements of Bronze Age Ceramic Style at the Micro-Regional Level*

Fortified tell site excavations in the twentieth century formed the basis for construction of a Bronze Age chronology in the Carpathian Basin. Typological and stylistic elements observed on these sites were used to create archaeological cultures for large areas, whose distributions changed over time. However, the use of large archaeological groups obviously masks internal regional variation, both chronologically and stylistically. Different river-valleys, as micro-regions, may have formed the basis for regular interaction, community activities and social practices, and thus may have left distinctive material culture. In this poster we compare stylistic elements of four different micro-regional areas in Eastern Hungary during two Bronze Age cultural phases. We evaluate the possibility that the large culture area names "Ottomány" and "Gyulavarsánd" mask internal variation recognizable among the surface collection material for 17 sites in the Lower Körös Basin. By considering other settlement types as well, we also investigate whether fortified tell sites provide a representative picture of regional ceramic manufacturing practices.

Barnard, Hans (Cotsen Institute of Archaeology at UCLA)

[309] *Cultural Continuity along the Western Red Sea Littoral*

The study of the ancient cultural history of northern Ethiopia, modern Tigray, often includes an interpretation of the obvious connections with the Arabian Peninsula, to the east, and the Nile Valley to the west. Less attention is usually given to contacts with the African heartland, to the south, and the relatively arid region between the Nile Valley and the Red Sea, usually referred to as the Eastern Desert, to the north. The cultural connections with the latter are reflected in linguistic and material traditions (basketry, ceramics, headrests, etc.) and more recently in the central place of coffee in daily life. In this presentation the long-term cultural continuity along the western Red Sea littoral will be illustrated. Given the limitations of the data currently available, this will be from a theoretical and more or less anecdotal perspective.

Barnard, Hans [240] see Braekmans, Dennis

Barnes, Gina (Durham University)
[148] Moderator

Barnett, Kristen (Bates College)

[50] *Community Perceptions and Effects of the Bridge River Community Archaeological Project, 2012–2016*

The Xwisten (Bridge River) community has had an ongoing collaborative relationship with the University of Montana, exploring the archaeology of the Bridge River Village, site Eerl4. The latest series of inquiries at the Bridge River Village focused on the excavation of Housepit 54, a single, mid-sized, semi-subterranean pithouse with 17 anthropogenic floors from occupations spanning 1800 BP–ca. 1850s CE. The goal of this research is to explore the perceptions of the discipline of archaeology, the dissemination throughout the community of archaeological findings and scientifically held beliefs regarding Housepit 54 and the ancient village, and the impacts that this project has had within the Xwisten and surrounding communities, including consideration of existing differences in world views and belief systems. The final outcome of the research is intended to facilitate greater understanding of conducting community collaboration, provide an opportunity to better understand community needs and desires with regard to archaeological research, and allow the Xwisten Community a place to provide feedback and valuation with regard to the experiences had as of the end of the 2016 field season and the final excavations at Housepit 54.

Barnett, Kristen [257] see Skinner, Dougless

Baron, Joanne (University of Pennsylvania), Liliana Padilla, Christopher Martinez and Arielle Pierson (University of Pennsylvania)

[125] *Ceramics of La Florida-Namaan: A Preliminary Report*

The Guatemalan archaeological site of La Florida, located on the San Pedro River near the Mexican border, was home to the Classic Maya polity known as Namaan. Hieroglyphic inscriptions from La Florida and elsewhere reveal the polity's widespread political contacts with sites in western Petén, Tabasco, and beyond, as well as a dynastic history spanning three centuries. While known to archaeologists since 1943, the site has only recently been the subject of a multiyear research project. In this paper, we will present the ceramics recovered during the 2016 season of the La Florida Archaeology Project, our first season of excavations. We aim to explore, in this season and in future excavations, the role of La Florida in commercial exchange along the San Pedro and between Classic Maya communities in Petén and the Tabasco Plain.

Baron, Natalie (Trent University) and Gyles Iannone (Trent University)

[214] *Investigating the Religious Landscape of Epicenters in Preindustrial Tropical States*

The landscape of an epicenter has been built and modified to suit the needs of the people, both nonelite and elite. Epicenters consist of administrative, ceremonial, and residential features within a central precinct, often encircled by a moat or wall. Rulers of early tropical states would use religious propaganda to promote their power and legitimacy, which in turn created the purposeful and sacred design of the epicenter. By using the comparative method, this paper will examine the geographical relationship of the epicenter and the religious background of preindustrial state formations in South and Southeast Asia (800–1400 CE) and Mesoamerica (250–900 CE). This method will allow for a greater consideration of the similar characteristics exhibited by tropical states across different historical contexts. On-site visitations and an extensive literature review of the datasets place an emphasis on architectural features and the monumentality of the epicenter.

Barragán Montero, Antonio [326] see Gill, Lucy

Barrera Rodríguez, Raúl [252] see Medina Martínez, Lorena

Barreto, Cristiana (Museu Paraense Emilio Goeldi) and Helena Lima (Museu Paraense Emilio Goeldi)

[327] *Understanding the Dispersion of Ceramic Styles in the Lower Amazon: What Is Koriabo?*

Archaeologists working in the lower Amazon have been identifying a particular ceramic style with a vast regional distribution, including the Caribbean, the Guyanas, the Amazon estuary and, more recently, the lower Amazon floodplain. This paper will discuss the distribution and variability of this style in the lower Amazon, its correlation with Carib speaking groups, and the possible contexts, processes and practices that generated such dispersion.

Barrientos, Tomás [131] see Canuto, Marcello A.

Barrientos, Tomás [218] see Davies, Gavin

Barrier, Casey (Bryn Mawr College)

[278] *Towns and Household Groups during a Period of Urban Transition in Native North America: A Case from the Early Mississippian Era in the Cahokia Region*

The development of large, complex settlements and the organization of associated institutions and social groups are major topics of research for anthropological archaeologists. The realization that precolumbian inhabitants of the central Mississippi Valley instigated complex social arrangements at urban scales makes Native North America a site of research that can contribute to the comparative study of urbanism. In this paper, previous and ongoing work near the site of Cahokia is discussed. A program of research has been started that is examining demographic shifts associated with the growth of large settlements during the period of urban transformations. As part of the process, an emerging view is one of social groups aggregating at various scales and creating complex arrays of communities, institutions, and settlements ranging from village, to town, to city. This view includes a real-time history of movements and constructions suggesting that these settlements were in flux, and that the sites and settlement “types” we study are a product of the dynamic urbanization process in the region. As a case study, the construction then rapid abandonment of an early mound-town by coalesced household corporate groups is provided that gives a rare look into one aspect of urbanism in this region.

Barrier, Casey [283] see Horsley, Timothy

Barrios, Edy (CUDEP-USAC)

[71] *Community Resilience in the Río Amarillo East Pocket: Commoner Occupation around Río Amarillo and Quebrada Piedras Negras at the end of Late Classic through Postclassic Periods*

Recent and ongoing research at residential groups at the sites of Río Amarillo and Quebrada Piedras Negras are providing a better understanding of the lives of commoners and of the population dynamics during the Late Classic through the Postclassic period in this area. These sites share the second-widest pocket of the Copan River Valley, and lie in the middle of one of the main trade routes between Copan and Quirigua. The excavations and mapping of the household groups distributed in this landscape provide an increased understanding of the people who inhabited this region close to the Copan metropolis during a time of complicated political, economic, and environmental change. Of particular interest are some of the differences found in the material culture of these sites, which all lie within the visual limit of each other. This paper will discuss both results of specific households and those of a larger mapping program.

[71] *Chair*

Barrios, Edy [71] see Capellin Ortega, Anarrubenia P.

Barse, William (Smithsonian Institution)

[220] *Orinoco Prehistory and Its Wider Relationships*

The archaeological sequence developed in the Upper Orinoco in the vicinity of the Atures Rapids has not only local continuity through time but exhibits broader relationships with northern South America. The earliest preceramic components in the region, dated to ca. 10,000 BP, can be linked to comparable occupations that have been documented in the Sabana de Bogota. Slightly later preceramic components represented by distinctive contracting stemmed projectile points show links to sites in central Brazil and to the El Inga related sites in Ecuador. The lengthy Barrancas Tradition and sequent Arauquin horizon also exhibit stylistic links to other ceramic complexes in northern South America. These ties through time will be examined and related to anthropological models of trade and exchange in northern South America.

Bartelink, Eric [30] see Gardner, Karen

Barth, Nicolas [329] see Stanton, Travis

Barton, Loukas (University of Pittsburgh), Baiyarsaikhan Jamsranjav (National Museum of Mongolia), Tuvshinjargal Turmubaatar (National Museum of Mongolia) and Christopher Morgan (University of Nevada, Reno)

[114] *Spatial Patterns of Human Land Use from Surface Collections in NW Mongolia*

The spatial distributions of artifacts from different periods of time reveal change in the nature and intensity of human activities in different kinds of places. This is particularly useful when trying to establish how patterns of human mobility and land use evolved during periods of dramatic environmental or economic change. The Uvs Nuur Basin of northwest Mongolia played host to both. Here, the distribution of glaciers, vegetation zones, and lake systems changed rapidly from the late Pleistocene through the early Holocene, encouraging novel adaptive strategies from humans and animals alike, while the adoption of an economy focused on domestic animals forever transformed the biota and stability of the landscape. Preliminary results of an intensive surface survey point to patterns of change in human mobility, interaction, and production in two distinct regions, providing unique insight on the prehistoric human ecology of the Uvs Nuur Basin and similar regions of northern central Asia, ca. 40.0–4.0 k BP.

[268] *Discussant*

Barton, Michael [38] see Bergin, Sean

Bartusewich, Rebecca (University of Massachusetts Amherst)

[132] *Understanding Interactions between Iron Age Polities in Cyprus through the Microscopic Lens*

This paper will address economic and political interactions of two Cypriot polities during the Iron Age prior to political transitions in about 450 BCE. Idalion is a polity in the interior, near the copper-bearing Troodos Mountains and Kition is a port town on the southern coast. These polities are separate by 20km of rolling hills and plains. By 450 BCE, Kition had obtained political control of Idalion, but there has been little research about these two urban areas interactions prior to this event. I have performed preliminary analysis of 100 thin sections to determine if in a mineralogically similar region one can differentiate between production locations and determine types of interaction. Using this data I have found that production characteristics such as the type clay processing, sieving, the speed of the wheel, and firing temperature were most informative. I applied a chaîne opératoire analysis to understand the way potters learn and adapt. Periods of stasis and change in production styles over several hundred years suggest a long-time relationship between the two localities, long before one politically overtook the other.

Bar-Yosef, Ofer (Harvard University)

[33] *Early Cultivation in China: Where and When*

For over 2.6 million years foragers did not demonstrate that cultivation was a way for obtaining food stability although occasional events may have escaped the archaeological records. Cultivation by hunter-gatherers across the continents (except for Australia) emerged during the Terminal Pleistocene and early Holocene as a response to limitation on mobility due essentially to competition among growing populations conceived archaeologically as “relative demographic pressure.” The paper will consider the impacts of the loss of a major land due to the Pacific sea rise and Holocene environmental and social fluctuations in North and South China as triggers for millet and rice cultivation. The hypothesis concerning “where” and “when” in the Chinese mainland will be discussed based on current evidence.

Bar-Yosef, Ofer [213] see Patania, Ilaria

Bar-Yosef Mayer, Daniella (Tel Aviv University)

[338] *Early Upper Paleolithic Shell Beads and Shellfish from Manot Cave, Israel*

The Early Upper Paleolithic (EUP) cave site of Manot, western Galilee, Israel yielded remains of the Ahmarian and Levantine Aurignacian technocomplexes. The malacofauna assemblages from the two technocomplexes were analyzed (NISP=1180). Dozens of ornamental shells, mostly deriving from the Aurignacian assemblages, include perforated *Nassarius gibbosulus*, *Columbella rustica* and *Antalis* spp. as well as two cowrie beads

found in association with human bones. The comparison of the Manot assemblage to the few published Levantine Early Upper Paleolithic shell assemblages reveals Aurignacian trends characteristic of circum-Mediterranean shell beads. Further research is necessary in order to characterize the Ahmarian shell assemblage. Edible mollusks include *Patella caerulea* and *Phorcus turbinatus* from rocky Mediterranean shores and Levantine land snails found as a shell midden. Mollusks were collected from the immediate vicinity of the site and from the nearest Mediterranean shore, about 15 km away. The consumption of shellfish and snails also represent an EUP trend characteristic of the Mediterranean region.

Barzilai, Omry (Israel Antiquities Authority)

[338] *The Dan David Expedition to Manot Cave: 2010–2016*

Manot Cave is a unique relict karst cave located in the western Galilee, Israel. The cave was inhabited from the Late Middle Paleolithic through the Early Upper Paleolithic periods until its main entrance collapsed some 30 thousand years ago. The cave consists of an elongated main hall and two side chambers. The topography of the main hall is composed of a long steep talus (ca. 30 m long) inclining from the original entrance of the cave to the center; a leveled area at the lowermost point of the main hall; and a smaller talus inclining from the eastern end of the cave. Seven excavation seasons (2010–2016) have been conducted so far at the Cave. The excavations revealed dense accumulations of Early Upper Paleolithic deposits by the cave entrance (Area E), at the center (Area D), at the base of the western talus (Area C), and at the leveled area (Area A). The aim of the symposium "In search for modern humans at Manot Cave" is to present the most updated interdisciplinary studies on Manot Cave which provide insights to the culture and environments of the Early Upper Paleolithic populations in the Eastern Mediterranean region.

[338] *Chair*

Barzilai, Omry [338] see Abulafia, Talia

Barzilai, Omry [338] see Goder Goldberger, Mae

Barzilai, Omry [338] see Sarig, Rache

Barzilai, Rebecca (Indiana University, Bloomington), Susan M. Alt (Indiana University) and Timothy R. Pauketat (University of Illinois)

[283] *Pottery and Religion at Greater Cahokia's Emerald Acropolis*

Since 2012, large-scale survey and excavations at and around the Emerald site east of Cahokia have investigated the religious foundations of the rise of that American Indian city. Emerald was a shrine complex, where religion was performed by Cahokians and pilgrims beginning around AD 1000. Excavations have revealed dense stands of nondomestic, ceremonial and public architecture alongside seemingly temporary, short-term housing. A prominent aspect of the rituality of the place was the use of pottery, possibly produced primarily on site. We consider the contexts and metrics of the Emerald ceramic assemblage in light of other indications of the vibrancy of earth and earthen plasters. The ceramic assemblage is then compared to Cahokia and contemporaneous assemblages from the region, highlighting the singular qualities of this most unusual religious destination.

Basanti, Dil (Northwestern University)

[309] *Network Approaches to Cosmopolitanism in Ancient Ethiopia (50–700 AD)*

This paper looks at how ideas of cosmopolitanism can be applied to the African context using Aksum (50–700 AD) in northern Ethiopia as case study. While there is much interest in issues of cosmopolitanism, or the making of a "world citizen" or a "world community" as drawn from eighteenth- to nineteenth-century conceptualizations, such issues become difficult to study on the African continent given the strong emphasis on personhoods configured around local, corporate contexts. Burial practices from ancient Aksum demonstrate particularly strong corporate personhoods, even while the kingdom was engaged in extra-local trade. Instead, using network theory, this paper looks at how the social dynamics implied by Aksumite burial practices would configure Aksum's regional connections across Tigray. In doing so, this paper seeks to understand what African case studies tell us about cosmopolitanism, and how these understandings highlight a wider range of ways that societies may be cosmopolitan

Basiran, Alper and Cevdet Merih Erek (Gazi University)

[90] *The Earliest Architectural Remains in Anatolia*

The occupation of man has played an important role on cultural innovation; at the same time this process has always been a requirement of daily life for generation continuity. Since the start of human life history, choosing of places for occupation species has had different features. For example, the cave or rockshelters were preferred by Paleolithic man and they have hot style caves and/or shelters due to the period; this developed in Pleistocene climatologic conditions that were cold because of glaciers on the earth. At that point, we have to take a look at the transitional periods such as the Epi-paleolithic. In 2016, different architectural remains obtained in Direkli Cave which is located on the slopes of Delihöbek Mountain in Central Taurus, Kahramanmaraş. Direkli Cave occupation has been described as part of the Epi-paleolithic period, and especially by Natufian Culture. Basically, Natufian culture contains pre-farming components such as geometric microliths, circular structures in caves (as in Hayonim Cave), axes and some traces of domestication. At that point, we can say that there are close relationships between settlement and/or occupational development and the origin of architecture in human life.

Bassett, Christine (University of Alabama)

[223] *Chair*

Bassett, Hayden [161] see Norman, Neil

Basso, Diego Martin [222] see Albeck, María

Bates, Brian (Longwood University), Walter Witschey (Longwood University), Craig Rose (Longwood University), Mary Farrell (Longwood University) and Erin West (Longwood University)

[224] *The Library Is on Fire, Now What? Assessing the Damage and How to Approach It: A Case Study from the Chesapeake Bay*

The Chesapeake Bay, one of the largest marine estuaries in the world, serves as a microcosm of the forces of shoreline environmental change such as sea level rise, land subsidence and erosion and the impacts that such change has on the archaeological record. Using shoreline analysis, empirical

observations and predictive modeling of four counties along the Bay, this project seeks to establish an understanding of the impacts on known archaeological sites in the study area as well as to assess potential high-probability site locations. The resulting data can be employed by government agencies, policy-makers, conservationists and others to determine the threat level posed by environmental change at the shoreline, thereby empowering informed decision-making about the allocation of resources to address the most urgent needs first.

Bates, Lynsey [317] see Galle, Jillian

Batist, Zachary [22] see Carter, Tristan

Batten, David C. [307] see Wilson, Michael

Battillo, Jenna (Southern Methodist University)

[229] *Paleofecal Analysis from a Human Behavioral Ecology Perspective*

Paleofecal research has benefited from many recent methodological advances, such as SEM and high-throughput DNA sequencing. However, as our results grow both more robust and more precise, our interpretations have not always followed suit. Researchers are eager to establish what was on the menu, but often more cautious in exploring the biocultural and evolutionary implications of those findings. Some scholars have argued that it is difficult to apply human behavioral ecology (HBE) models to archaeological data due to its incomplete nature. Although as Tim Riley (2012) points out, paleofeces represent a set of a single person's subsistence choices within a constrained time period, making them an ideal vehicle for the application of diet-breadth and other optimality models. This presentation will address how paleofecal analysts can apply HBE models to discern subsistence choices and provide a theoretical base for understanding the motivations for those choices. To that end, I will use examples of paleofecal research from the American Southwest, including my own work applying diet-breadth and patch-choice models to the analysis of 44 Basketmaker II period paleofeces from Turkey Pen Ruin, Utah.

Batty, Sylvia (Institute of Archaeology, NICH), Rebecca Friedel (University of Texas at San Antonio) and Leah McCurdy (University of Texas at San Antonio)

[7] *To the Mountain: Heritage Preservation through Archaeological Literacy in San Jose Succotz, Belize.*

Maya archaeology has seen a steady shift to the integration of community heritage interest and ownership in the design, execution and outcomes of research and preservation efforts. This poster describes a heritage outreach project focused on archaeology literacy development among grade school children in the community of San Jose Succotz, Belize, adjacent to the Xunantunich archaeological reserve. We authored a fully illustrated book entitled *To the Mountain* (2016) for the Succotz community, incorporating information on two sites that have been extensively investigated with the assistance of Succotz community members. *To the Mountain* is written in English, Spanish, and Yucatec, the three main languages spoken in Succotz. We distributed one copy of the book to each grade school child and made an eBook available online for download. By monitoring the use of this book by educational institutions and community members the changing perceptions of heritage and the effectiveness of heritage preservation through literacy campaigns can be established and observed. We expect that the familiar concepts in the book will make it an ideal educational tool for history and language education. We hope it will foster a culture in which Maya ancestry and language are not points of shame or social stigma.

Batun-Alpuche, Adolfo I. (Universidad de Oriente), Maia Dedrick (University of North Carolina at Chapel Hill) and Patricia McAnany (University of North Carolina at Chapel Hill)

[280] *Identifying Farming Strategies within Changing Regional Contexts at Tahcabo, Yucatán*

Colonial- and national-period studies of agricultural practices in Yucatán can provide useful case studies to address current theoretical concerns in political ecology. Perspectives on livelihood strategies today are broadly comparable to household-level studies of economic activities accessible through archaeology, especially given historical archaeology's attention to market integration and technological innovations. The time depth available through archaeological study complements contemporary analyses that address decision-making processes and the connections between global and local phenomena. In particular, archaeological study may contribute perspectives on the possible outcomes, sustainable or otherwise, of specialized and intensive production. This presentation examines Colonial-period strategies based on evidence from two contexts at Tahcabo: households and rejolladas (limestone solution sinkholes that contain deep soils). Given the sociopolitical, environmental, and demographic dynamics known to have existed at the time, we consider farming choices and their implications for risk management and long-term sustainability.

Batun-Alpuche, Adolfo I. [36] see Dedrick, Maia

Bauer, Alexander (Queens College, CUNY) and Owen Doonan (California State University Northridge)

[265] *The Black Sea as a Fluid Frontier: Connectivity, Integration, and Disarticulation from the Fourth to First Millennium BCE*

Recent years have witnessed increasing scholarly attention to the Black Sea, a region often considered peripheral to better known "cores" of cultural activity, such as the Mediterranean, Europe, the Near East, and even the Caucasus. Challenging conventional views of the Black Sea as largely disarticulated prior to the arrival of Greek colonists in the seventh century BCE, this paper argues that ongoing, informal networks of interaction existed across the region during the previous millennia, networks that both facilitated and challenged later colonial and imperial processes. Presenting a technological study of pottery from recent investigations at the Black Sea coastal site of Sinop, Turkey, and other Black Sea coastal contexts, this paper presents the argument that the appearance of shared traditions may both reflect and have served to reinforce an emergent "Black Sea" identity at different phases in the region's prehistory, suggesting that alternating cycles of integration and dis-integration waxed and waned across Black Sea networks of connectivity over the millennia. It is hypothesized that these phases occurred in response to broader interregional dynamics of connectivity between the Near East, southeast Europe, and the Mediterranean.

Bauer, Andrew (Stanford University) and Erle Ellis (University of Maryland, Baltimore)

[242] *The Anthropocene Divide: Obscuring our Understanding of Socio-Environmental History*

Much scientific debate has focused on the timing and stratigraphic signatures for the Anthropocene. In this paper, we argue that strident debate about the Anthropocene's chronological boundaries arises because its formal periodization necessarily forces an arbitrary break in a long history of human alteration of environments. The aim of dividing geologic time based on a "step-change" in the global significance of socio-environmental processes goes directly against the socially differentiated and diachronous character of human-environment relations. The environmental outcomes of human actions are not the coordinated synchronous product of a global humanity, but rather result from heterogeneous activities rooted in situated sociopolitical contexts

entangled with material difference. Thus, the Anthropocene periodization, what we term the “Anthropocene Divide,” obscures rather than helps understandings of long-term human environmental relationships and the social and political contexts of their production.

Bauer, Andrew [167] see Johansen, Peter

Bautista, Stefanie (Stanford University), Justin Jennings (Royal Ontario Museum) and Willy Yépez Álvarez

[170] *Untangling Wari Colonization, Trade, and Administration in Coastal Arequipa from the Site of Quilcapampa, Sigwas Valley*

The seventh century AD marked a period of great social change in the coastal valleys of Arequipa, Perú. During this time, an increase in violence, population growth, and social complexity was met with foreign influences from the Wari state of the central highlands. While scholars have long asserted that Arequipa fell under Wari control at this time, the evidence for direct state control has never been demonstrated conclusively in the region. This presentation reports the results of our excavations at the monumental center of Quilcapampa, located in the Sigwas Valley. Quilcapampa had long been called a Wari administrative settlement, but until now has remained poorly understood. Our excavations reveal that the site began, and was briefly occupied, in the mid-ninth century. Moreover, architectural patterns and material culture demonstrate that individuals who built and occupied this site used a combination of Wari and local styles and practices. The data suggests that Wari settlers may have built Quilcapampa, and founded on and oriented around a major coastal transportation route. However, it still remains unclear based on the recovered data what administrative function and role the state played—if any—in the functioning of the settlement and in the region in general.

Baxter, Erin (University of Colorado, Boulder)

[373] *Aztec at the End of Days: Great House to Crossroads*

New investigations of primary source material reveal that the final days of Aztec were extensively recorded (but not published) by Earl Morris. This paper will present analyses of burial, feature, architectural and artifactual data that indicate a chaotic and tumultuous end at Aztec preceded by behaviors that differed drastically from Chaco Canyon or in other twelfth century great house sites. These practices are seen in mortuary data, in room remodeling the increased frequency of habitation of rooms, and the notable conversion of Chacoan rooms to both mortuary and trash-fill contexts. Finally, while some great house rooms burned on small scales, Aztec burned catastrophically. This destruction coincides with upheaval in the adjacent Mesa Verde region, which also experienced high levels of violence, and trends toward aggregation followed by migration and regional depopulation. I will argue that data indicate skewed sex ratios, unrecognized high status individuals, violence—particularly toward women and children—the practice of witchcraft, and that evidence of remodeling and final destruction of Aztec precipitated upheaval at the end of the Chacoan system and the conversion of the site to a refugium during the depopulation of the Mesa Verde region.

[315] *Discussant*

[373] *Chair*

Baxter, Jane (DePaul University)

[172] *Emotional Practice and Perspectives on Emotion in the Archaeology of Childhood*

Childhood is a stage of life that engenders particularly empathetic and emotional responses from people, and those reactions affect how the topics of children and childhood are perceived, impact the individual(s) conducting research, and shape the ways we think about children as subjects. This paper is a wide ranging exploration of my experiences in the archaeological study of childhood, which includes both the role of emotion when interpreting childhood in the past and the emotional contexts of practice when doing the archaeology of childhood. This topical approach will be used to think more broadly about how emotions can enter into archaeological research in ways that both respect material evidence and the humanity of archaeologists and those they study in the past.

Baxter-McIntosh, Jill, Crystal C. Glassburn (Northern Land Use Research Alaska, LLC), Robert C. Bowman (Northern Land Use Research Alaska, LLC) and Morgan R. Blanchard (Northern Land Use Research Alaska, LLC)

[257] *Tales from the Trench: An Analysis of Artifacts Salvaged from Two Western Thule Sites in Kotzebue, Alaska*

Monitoring and salvage archaeology is often viewed as an anathema to the archaeological record. Nevertheless, both situations frequently occur within CRM contexts. Here, we present analyses of lithic material, organic tools, pottery, and fauna from two subsurface house features in Kotzebue, Alaska. Radiocarbon dates indicate that the two sites are roughly contemporaneous, dating to the end of the Medieval Warm Period, and are associated with the Western Thule tradition. The materials were recovered during trenching activities for a fiber-optic cable and retain little provenance integrity. However, we argue that the analysis of “salvaged” artifacts, even without ideal stratigraphic or spatial information such as these, can be informative for the archaeological record and CRM companies should encourage contractors to support analysis and research that can contribute to knowledge at both the local and academic level.

Bayham, Frank (California State Univ., Chico) and Kasey Cole (California State Univ., Chico)

[383] *Territoriality, Intertribal Boundaries, and Large Game Exploitation: Empirical Evaluation of a Spatial Bioeconomic Model of Conflict in the Western U.S.*

Being a high-ranking prey item, large game are often desired for their economic and prestige values, both of which may be converted to an individual's status. As such, big game can serve as a potential axis for competition between linguistic or ethnically distinct groups particularly under conditions of population stress leading to resource depression. This dynamic has been modeled using an evolutionary ecological approach that combines an amalgam of standard foraging models with the added cost of intergroup conflict (Bayham and Bayham 2016). This study identifies several archaeological correlates of the model and explores its empirical applicability and testability in various areas of western North America. We specifically focus on localities in northern California and adjacent regions which utilize large artiodactyls, have conflict with neighboring groups, and buffer zones. Preliminary results are promising and we suggest the model may prove beneficial in the construction of regional research designs.

Bayham, Frank [251] see Cole, Kasey

Bayman, James

[129] *From Hohokam Archaeology to Narratives of the Ancient Hawaiian “State”*

The analysis of material correlates to interpret cross-cultural variation in ancient political economies is a conventional and time-honored tradition in world archaeology. The material correlates that archaeologists use to gauge degrees of social stratification include evidence of subsistence intensification, hierarchical settlement patterns, craft specialization, large-scale monumentality, and differentiated mortuary programs. Ironically, recent claims for the rise of ancient states in the Hawaiian Islands confound prevailing models of political economy among the Hohokam in south-central Arizona. My

comparison of Hohokam and Hawaiian archaeology reveals that although their material records were comparable in scale, many archaeologists have concluded that Hohokam society (unlike Hawaiian society) was governed by a marginally stratified non-state political economy. These findings challenge anthropological archaeologists to ponder the theoretical ramifications of relying on material correlates to construct cross-cultural models of ancient political economies.

[84] *Chair*

Bayman, James [335] see Fish, Paul

Bazaliiskii, Vladimir Ivanovich [330] see van der Haas, Victoria M.

Beach, Timothy (University of Texas at Austin), Sheryl Luzzadder-Beach (University of Texas at Austin), Colin Doyle (University of Texas at Austin), Nicholas Dunning (University of Cincinnati) and Nicholas Brokaw (University of Puerto Rico)

[83] *The Critical Zone Revolution from 2016 Lidar and Two Decades of Multi-proxy Geoarchaeology around the Programme for Belize*
Over the last two decades we have studied agroecosystems in the Programme for Belize (PFB), a valuable and privileged reserve for an exceedingly wide array of research efforts. Aspects of the agroecosystems preserved in the PFB include terraces, wetland fields, aguadas, ecology, and curious wall features under the canopy of this tropical forest with some savannas. We based these studies on excavations along multiple transects across this karst region's uplands, escarpments, bajos, floodplains, and terraces and on hundreds of soil and water chemistry analyses. This paper appraises these excavations and their findings in light of a new, 300 km² swath of lidar that covers each of these landscapes in the PFB and its surroundings, especially the Blue Creek area. We focus on three main topics based on our 2016 field and remote data that reflect these decades of study: wetland fields, agricultural terraces, and soil-human forest interactions. The lidar imagery shows us new evidence for wetland field systems, terracing, and the critical zone (from rock to soil to forest to the lower atmosphere), which creates unprecedented resolution on this remarkably florid region's history of human and landscape interaction.

Beach, Timothy [83] see Luzzadder-Beach, Sheryl

Beaubien, Harriet "Rae" (Smithsonian/Museum Conservation Institute)

[276] *Field Conservation of Skeletal Remains: Techniques, Materials, and Implications for Future Analysis*

The information potential of skeletal remains—as for any excavated material—is impacted by the conditions of archaeological burial, and the environments and actions encountered during subsequent excavation, laboratory processing, study, and storage. A conservation approach emphasizes the mitigation of threats to material stability and integrity, which for excavated collections are often most critical at the point of archaeological exposure and recovery. Techniques and materials in use by conservators for stabilizing, lifting, and providing protective housings for skeletal remains in the field are discussed, using case examples primarily from terrestrial archaeological projects in Mesoamerica. Implications for the use of various modern synthetic consolidants and adhesives will be included, based on results of recent experimental work carried out at the Smithsonian's Museum Conservation Institute examining their effects on results of biomolecular instrumental analysis of skeletal material.

[392] *Discussant*

Beaudoin, Ella (American University), David R. Braun (George Washington University) and Jonathan S. Reeves (George Washington University)

[153] *Tool Use across Space in the Middle Pleistocene: Novel Techniques of Edge Damage Analysis at Elandsfontein, South Africa*

Although studies of lithic technology have been ongoing for over a century our knowledge of what tools were used for is still poorly resolved. Detailed analysis of microscopic damage has been the major focus studies of tool use. However, these studies are often limited to a subset of tools that have not undergone postdepositional damage and can be studied microscopically. Recently new approaches to damage patterns on the edges of simple flaked tools have been used to develop assemblage scale analyses of tool use in a variety of Paleolithic contexts. Here we apply these techniques to a large assemblage of stone artifacts from multiple excavations at Elandsfontein (1 Ma—780Ka) from the Western Cape of South Africa. We incorporate experimental tool use to develop possible hypotheses about what certain patterns of damage represent. Measures of damage location, continuity, and extent provide intriguing insights into the variability in tool use patterns. Results indicate that tool use patterns are largely heterogeneous across a relatively large landscape. This research was supported by the National Science Foundation Research Experience for Undergraduates (NSF-BCS-1620907).

Beaudoin, Ella [259] see Peixotto, Becca

Beauval, Cédric [85] see Boileau, Arianne

Beaver, Joseph (University of Minnesota Morris)

[342] *Grave Markers of Infant Burials in Historical Cemeteries in West-Central Minnesota*

Roughly one in eleven individuals buried in historic-period cemeteries in Stevens County, Minnesota, died before reaching one year of age. This paper examines the grave markers of a subset of the 913 infants buried between 1870 and 1970, looking at both chronological and contemporary variation in style, production, and information recorded. Explanatory factors examined include religion (using the cemetery of burial as a proxy), evidence of associated maternal mortality, and when available, documentary evidence of parental socioeconomic status, ethnic origin, other children, and so forth.

Bebber, Michelle

[342] *A Petrographic and Material Science Approach to Understanding Temper Selection in the Prehistoric Ceramic Sequence of the Scioto River Valley, Ross County, Ohio*

This research elucidates the complex nature of pottery tempers used in the Scioto River Valley of south central Ohio. The data suggest that during the Late Prehistoric Period indigenous potters began using composite temper types with concretionary hematite as a secondary temper—most often found alongside shell as the primary temper. This project involved two phases: 1) petrographic research and 2) mechanical properties testing. The initial research phase involved a detailed analysis of the clay matrix using polarized light microscopy. Precise temper densities were determined using point counting procedures. The second phase involved the production of test samples based on the petrographic data, followed by compressive bend testing

of the experimental samples. The test samples were evaluated for mechanical strength, fracture toughness, and rate of thermal expansion. It was shown that hematite tempered samples exhibited significantly higher strength values—however, these samples fractured in a catastrophic manner signaling low post-peak toughness. The shell tempered samples exhibited the weakest strength values—however, they exhibited the most elasticity and most resistance to post-peak fracture. Based on the data, it is suggested that these two distinct temper types were being used in complement.

Becerra, Gibrán

[10] *Las Huellas del Poder: Estrategias políticas en el este de Los Tuxtlas, Ver.*

El ejercicio del poder en Mesoamérica puede ser medido y estudiado de diferentes formas. Una de estas formas tiene que ver con los despliegues políticos ligados a los programas arquitectónicos y las estrategias políticas implementados a partir de estos elementos. En este trabajo se pretende mostrar de forma visual los resultados de un estudio que evaluó la centralización del trabajo de la arquitectura pública como un índice de poder político.

Becerra Alvarez, Marimar (Universidad Veracruzana)

[10] *Sistemas de almacenamiento en un puerto prehispánico: Consideraciones generales*

Un sitio con características portuarias, en el cual se da una dinámica de bienes, personas, información, etc., no sólo necesita captar y distribuir, sino también cerciorarse de la preservación de dichos bienes. En este panorama, los sistemas de almacenamiento son eje fundamental, ya que preservan los bienes hasta el momento en que son requeridos por el usuario final, lo que implica que los sistemas de almacenamiento deben estar organizados y estructurados para coincidir con los objetivos del consumo.

Beck, Charlotte (Hamilton College) and Amanda Taylor (Pacific Lutheran University)

[51] *Bear Creek and the Pacific Northwest Western Stemmed Tradition*

The lithic assemblage from Bear Creek (45K1839), a late Pleistocene-early Holocene site in King County, Washington, is representative of the Western Stemmed Tradition (WST), likely the oldest lithic tradition in most areas west of the Rocky Mountains. It is followed in the Pacific Northwest by the Olcott Tradition. Although some argue that Olcott represents an intrusion from Alaska, archaeological evidence supports in situ development from the WST. In the Great Basin the WST is biface oriented, represented by a relatively standardized reduction sequence present in assemblages across that region. On most of the Columbia Plateau, however, the WST appears to be a core and flake/pseudo blade technology, which is well suited to the reduction of tough, coarse-grained materials so prevalent in that area. Biface reduction is only one of several core reduction strategies represented in the Bear Creek assemblage; others include multidirectional unpatterned, centripetal, and unidirectional core reduction. In this poster we demonstrate that the Bear Creek assemblage identifies more closely with the core and flake/pseudo blade strategy of the Columbia Plateau than the biface-oriented strategy of the Great Basin.

Beck, Jess (University of Pittsburgh—Center for Comparative Archaeology)

[139] *Post-Mortem Manipulation, Movement, and Memory in Copper Age Iberia*

Post-mortem manipulation of human remains played a critical role in mortuary practices in Copper Age Iberia (c. 3250–2200 BC). During this period in Spain and Portugal, individuals were buried communally in tholos-type tombs, as well as natural or artificial caves and rockshelters. Evidence from across Iberia suggests that mortuary practices included the manipulation and movement of previously interred bodies, either in order to clear space for new individuals, or to facilitate secondary reburial in new locations. I focus on evidence from the site of Marroquies Bajos (Jaén, Spain), which at 113 ha is one of the largest villages known for the Iberian Copper Age. Marroquies contained at least seven different mortuary areas, and shows evidence of multiple funerary processes, including secondary burials and communal burial in mortuary structures or artificial caves. The latter two treatments suggest that at specific points in time, members of the community came into repeated and deliberate contact with human remains. By contextualizing Marroquies Bajos mortuary practices within a broader regional pattern of post-mortem manipulation across the Iberian Peninsula, it is possible to explore the ways in which these mortuary practices influence the construction of communal and individual identities in Copper Age societies.

Beck, Robin [283] see Horsley, Timothy

Becker, Hilary (Binghamton University)

[132] *Branding the Mediterranean: Naturally-Sourced Products and Their Containers in Greece and Rome*

The ancient trade in olive oil and wine is well understood thanks in no small part to typologies established for their transport containers. A synthetic survey of the containers used to transport other naturally-sourced products, such as pharmaceuticals, perfumes, and pigments, is lacking. Such products were subject to counterfeiting and adulteration in antiquity, thus packaging and labeling were often valuable tools for ancient consumers to help them recognize products. For example, the astringent lykion, when sourced from India, was recognizable because it was transported in leather bottles, made of either camel or rhinoceros skin. A locally produced lykion from Sicily was instead put in distinct jugs, some of which were labeled with the drug's name and the name of the druggist. In both cases, a consumer was given clues to help identify the product's origin, which could serve as a guarantee of quality. Containers for herbs, pigments, and perfumes, as well as surviving examples of labeled products themselves, facilitate our understanding of how naturally-sourced products traveled (often at great distances). Exploring this system not only broadens our understanding of the trade in naturally-sourced products, but also provides insight into what an ancient consumer would have known at the marketplace.

Becker, Rory (EOU), George Holley (Minnesota State University Moorhead) and Jakob Jensen (University of Utah)

[375] *Use of Ultraviolet Imaging to Enhance Analysis of Incised Stone Artifacts*

Monochrome ultraviolet (UV) photography provides a new method in the analysis of incised imagery on stone artifacts. In this study, the technique is used to enhance the interpretation of figures on a collection of finely incised catlinite tablets from the Red River Valley of Minnesota and North Dakota. The nine hand-sized tablets included here are commonly associated with the Oneota tradition, although these display designs rooted in Plains themes. These tablets are ideal for the method as they bear multiple, sometimes overlapping, incised designs that are subsequently marred by scratching/cutting. A comparison of traditional methods with the monochrome UV imagery shows a high level of detail in the UV photography that is not readily discernible using traditional methods. Marks and incised lines visible in the UV imagery but not visible in the color photography, or to the aided or unaided eye, inform both the manufacture process and interpretation of figures identified on the tablets.

Becker, Sara (University of California, Riverside)

[92] *Osteoarthritis in Hands, Feet, Spine, and Temporomandibular Joint from Individuals Buried at Tiwanaku Sites in Moquegua, Peru*

This study evaluated evidence of osteoarthritis in the multiple joints of the wrist and hand (ulnae, radii, carpals, and metacarpals, finger phalanges), ankle and feet (tibia, tarsals, metatarsals, foot phalanges), spine (cervical, thoracic, lumbar vertebrae), and temporomandibular joint from human skeletal

remains previously excavated from Tiwanaku sites within the Moquegua Valley of Peru (AD 500–1000). Osteoarthritis, a type of degenerative joint disease with a complex etiology, has been shown to occur in situations where movements are repeated frequently enough to damage joint surfaces. This skeletal condition was used to understand patterns and levels of activity from five Tiwanaku colony sites (M1, M10, M11, M43, M70). Data were collected from older juveniles and adults ($n = 183$), cross-evaluated by age-at-death and sex, and preliminary results show differences, especially in hands, feet, and spine, between individuals from these sites. In addition, evidence of osteoarthritis in the temporomandibular joint, especially among younger folk, may be related to artificial cranial modification. Overall, these results support the idea that the site groupings represent spatial differences in occupation and that repetitive labor likely began among older subadults (10+ years) in the prehistoric Andean culture of Tiwanaku.

Becks, Fanya (Stanford University)

[172] *Archaeology as Meditative Practice*

In this paper I will illustrate how my research praxis necessarily altered as a product of close collaboration and consultation. The Muwekma Tribe of the San Francisco Bay Area (California, USA), is a community that has been eager to engage with respectful researchers in the analysis of their ancestors remains, once they have been disturbed. As a non-indigenous researcher collaborating with the tribal community, aspects of proper respect and care toward ancestors, and materials associated with them, in the form of focus, love, respect and acknowledgement, have been integral in my engagement with plant remains from ancestral Ohlone graves. The ethics of calm, careful, and one pointed focus throughout material analyses have deeply altered the way that I have engaged with archaeological materials, and have illustrated a necessity to transcend secular and materialist ontologies when interacting with, and thinking about, Muwekma's ancestral heritage.

[291] *Discussant*

Beckwith, Laurie (Douglas College)

[270] *A Late Formative Period Site in Chimborazo Province, Ecuador*

Compared to the coastal areas of Ecuador, the central highlands of Ecuador are not well-known archaeologically, especially for the Formative Period. This paper will report on preliminary survey and excavation research carried out in the Chibunga River Valley, to the south of the modern city of Riobamba, during the 2009 and 2012 field seasons. Test excavations were carried out at the site of Collay, located on a mesa at 3,100 masl, to obtain a sample of material culture and material for dating. The site produced a series of Late Formative Period radiocarbon dates and evidence of a well-developed ceramic tradition that while unique to the site, shows a clear relationship to coastal Late Formative Period ceramic styles and to those from Cerro Nariño to the south. In addition the presence of exotic materials, such as spondylus, obsidian and green and alabaster-like ground stone bowls, demonstrates the site's participation in substantial trade networks. Finally, the location of the site in relationship to nearby mountains and the presence of standing stones with pecked bowls are suggestive of the ritual nature of the site.

[270] *Chair*

Bedford, Stuart (Australian National University)

[36] *The Archaeology of Colonialism and Capitalism in the Southwest Pacific: The Compagnie Calédonienne Nouvelles-Hébrides (CCNH) on Malakula, Vanuatu*

Much of the European mapping of the South West Pacific occurs relatively late in terms of global history. In Vanuatu (ex New Hebrides) the first visits were Spanish ships in 1606. The wider archipelago was not further explored until the visit of Cook in 1774 but soon afterward it had been incorporated into the rapidly infilling global map. The geography, climate and people had been described as had hints of the economic potential and the islands could now be discussed and dissected among the parliamentarians, business houses, proselytizing churches and learned societies of Europe and beyond. The tentacles of global capitalism, intertwined with colonial and missionary encroachment were soon to follow. One of the early drivers of European encroachment, and its associated introduction and distribution of exotic wares and technologies, plants and animals and disease was the Compagnie Calédonienne Nouvelles-Hébrides (CCNH). This paper outlines how archaeology can contribute to the understanding of this period in this region which saw radical change to traditional societies over a relatively short time.

Bednar, Sarah

[337] *The Baalche' Group: An Investigation of a Preclassic Maya Palace at Yaxnohcah, Campeche, Mexico*

As part of the ongoing research into the development of sociopolitical complexity at the Maya site of Yaxnohcah, the Proyecto Arqueológico Yaxnohcah has been conducting investigations in the Baalche' Group, a large courtyard group located at the center of the site. The group sits adjacent to many prominent architectural features, including a Preclassic period E-Group assemblage, a ball court, and a water reservoir. Radiocarbon dating and ceramic analysis has revealed that the Baalche' Group itself was founded during the Late Preclassic period and was continuously occupied until the Terminal Classic period. Furthermore, our research suggests that the group likely functioned as an early palace, a place where the emerging rulers of Yaxnohcah resided and governed. This paper will present the findings from the investigations in the Baalche' Group, with a particular focus on the factors that led to the early emergence of a palace complex at Yaxnohcah during the Preclassic period.

Beekman, Christopher (University of Colorado Denver) and Verenice Y. Heredia Espinoza (Colegio de Michoacán)

[179] *In the Land of the Blind, the One-Eyed Man Is King: Los Guachimontones, Jalisco*

The site of Los Guachimontones was occupied from the late Middle Formative to the end of the Postclassic period. It had a bimodal history of occupation, with the first peak corresponding to the Late Formative period (100 BC–AD 200) and the second to the Late Postclassic (AD 1400–1600). It had an estimated population of 4,000–6,000 people in the Late Formative, when most of the public architecture was constructed. This makes it a very modest settlement in comparison to other Mesoamerican capitals, but it was the primate center for the Tequila valleys, and likely all of far western Mexico at the time. Assessing its role has thus been complex. Here we consider the activities reconstructed for the site to date—a preference for community ritual over private ritual, cooperation over aggrandizement, and an orthodox interpretation of ideology—to characterize Los Guachimontones as an exemplary center that dominated the southern Tequila valleys. Beyond that zone however, lineage ritual increased in importance, highlighting the limits on the site's power.

Beggen, Ian (North Carolina State University) and Joseph A. M. Gingerich (Ohio University)

[262] *Exploring Artifact Trampling at an Early Paleoindian Campsite*

Taphonomic processes such as trampling can have a major impact on the interpretation of site formation, artifact distribution, and use-wear analyses. This poster presents a preliminary spatial and lithic analysis of artifacts from the Shawnee-Minisink Paleoindian site in Pennsylvania, USA. Using a high resolution point-provenience database of Paleoindian artifacts, possible trampling damage is mapped and analyzed in order to distinguish if high foot traffic areas exist at Shawnee-Minisink, such as between hearths or zones of specialized activities. Trampling of lithic debris by human activity can be difficult to assess in the archaeological record. Evidence of trampling, however, is explored through multiple assessments: the vertical distributions of artifacts, the horizontal dispersion of different artifact types and sizes, and an analysis of artifact edge damage. Graphical displays of damaged artifacts

and distinct spatial distributions allow for a better interpretation of activity areas and site occupation. In combining artifact metrics, artifact edge damage, and the spatial distributions artifacts we expect to identify incidents of cultural disturbance at Shawnee-Minisink. These data contribute to a larger body of spatial analysis research aimed at better understanding the occupation of mobile hunter-gatherer campsites.

Begossi, Alpina [45] see Colonese, Andre Carlo

Bélangier, Christian [178] see Loewen, Brad

Beldados, Alemseged (Addis Ababa University) and A. Catherine D'Andrea (Department of Archaeology, Simon Fraser University)
[171]

Agricultural History of the Horn of Africa: New Archaeobotanical Evidence from Mezber

Archaeobotanical analysis of samples from the site of Mezber are underway with the goal of investigating the early agricultural history of northern highland Ethiopia. Mezber is a Pre-Aksumite site excavated by the Eastern Tigray Archaeological Project (ETAP) with cultural deposits dating from 1600 BCE to CE 1, and occupied over four phases. In 2014–2016, a total of 59 soil samples ranging in size from 1.8 to 7.5 liters was processed by manual flotation. Macrobotanical remains from light fractions were identified with the help of comparative collections at the Archaeology Laboratory, Addis Ababa University. Identified crop species include barley (*Hordeum vulgare*), emmer (*Triticum dicoccum*), lentil (*Lens culinaris*), linseed (*Linum usitatissimum*) and the indigenous staple crop tef (*Eragrostis tef*). Direct AMS dates were obtained on charred lentil and barley recovered from the earliest occupational phase, with determinations of 2810±30 BP (1050–895 cal BCE) and 2780±30 BP (1004–844 cal BCE), respectively. These AMS determinations constitute the earliest directly dated evidence for crops in the Horn of Africa. In addition, the extended occupational sequence at Mezber provides a window on changing agricultural practice throughout the Pre-Aksumite period.

Belfer-Cohen, Anna [169] see Hovers, Erella

Beliaev, Dmitri (Knorozov Mesoamerican Center, Russian State University for the Humanities), Philipp Galeev (Knorozov Mesoamerican Center, Russian State University), Sergei Vepretskii (Lomonosov Moscow State University), Camilo Luin (Universidad de San Carlos de Guatemala) and Alejandro Garay (Universidad de San Carlos de Guatemala)

[298] *Development of a Classic Maya Secondary Polity at Itzimte*

Itzimte (municipio La Libertad, Department of Petén, Guatemala) is a medium-sized Maya site in the savanna region in Central Petén. It was first described by Theobert Maler in 1908 and later visited by Sylvanus Morley in 1915 and 1921. In 2002 it was studied by Atlas Arqueológico de Guatemala team led by Hector Mejia. Itzimte consists of 6 principal plazas and 16 dispersed patio groups occupying about 50 ha. Monumental corpus of the site included 20 stelae (10 carved) and 12 altars (4 carved). During the fieldwork of the Atlas Epigrafiológico de Petén project from 2013 to 2016 we redocumented major part of Itzimte hieroglyphic inscriptions. Dynastic count recorded on Stela 7 implies that the ruling house of Itzimte was founded in Protoclassic (75–100 AD). Although Early Classic (250–600 AD) history is unknown, we identified names of Late Classic rulers. Late development of Itzimte comparing to other neighboring polities seems to be related to its alliance with Ik'a (Motul de San Jose) kingdom around 760–770 AD.

Belkin, Sara (Boston University) and Daniel Plekhov (Brown University)

[260] *Potential for Spatial "Big Data" in Historical Archaeology: A Demonstration of Methods and Results*

Historical Archaeology has seen a steadily increasing embrace of Geographic Information Systems (GIS) for the purposes of site recording, preservation and management, but has seen little to no use of the plethora of spatial datasets already publicly available. Such datasets include census, tax, and immigration records, property and housing maps, and archived aerial and satellite imagery, which when properly integrated in a GIS, have great potential for further contextualizing historical archaeological data and analyzing them at geographically broader scales. In this poster we present some of these publicly available data sources with a case study examining the consumer practices of an Irish-American family in early twentieth-century Milton, Massachusetts. We draw on data from excavations at the M.B. Wakefield Estate, U.S. census records, and other sources to plot where they purchased their household goods and to determine if these places are best characterized as Irish neighborhoods. Through this we can explore questions related to transnationalism, alienation practices, and the importance of community. This case study will illustrate the potential of these sources for use in archaeological studies, the ease with which they can be accessed and utilized with conventional archaeological data, and their use in answering broad anthropological questions.

Belknap, Lori (Cahokia Mounds Museum Society)

[283] *Chair*

Bell, Ellen (California State University, Stanislaus), Marcello A. Canuto (M.A.R.I., Tulane University) and Cassandra Bill (Langara College)

[39] *Pushing the Limits of Power: Copan Expansionist Strategies in the El Paraíso Valley, Western Honduras*

The reign of K'ahk' Uti' Witz' K'awil, Copan Ruler 12, has been rightly hailed as a pivotal time in Copan's political history. Given that no monumental constructions on the Copan Acropolis have as yet been securely attributed to his patronage, this long-lived ruler appears to have turned his focus outward, expanding the Copan kingdom into a multiethnic polity with a long geographic reach. In this paper we explore Ruler 12's administrative strategy in one region of the Copan kingdom, the El Paraíso Valley. Stratigraphic evidence, radiocarbon dating, pottery and other portable material culture, and stylistic analysis of mosaic architectural sculpture suggest that the site of El Paraíso was established as a Copan-style administrative center in the mid-seventh century AD, nearly 20 years after Ruler 12's accession. In this paper we bring recent analyses to bear on questions about the timing, function, and affiliation of this center and its founding.

Bell, Ellen [71] see Johnson, Erlend

Bell, Lynne

[139] *The Histotaphonomy of Human Skeletal Exposure within a Neolithic Long Cairn at Hazleton, UK*

The total excavation of the Cotswold-Severn Neolithic long cairn at Hazleton was unusually meticulous and represents an excellent example of long term skeletal exposure. Some discussion exists around the nature of bodies prior to deposition in these long cairn structures and histotaphonomy is here used to consider this question. The human remains at Hazleton were recovered from two spatially distinct stone-lined chambers in a highly disarticulated and commingled state. During excavation each element or fragment were individually numbered, totaling over 9,000. Later anthropological assessment

managed to re-associate partial individuals, permitting a spatial understanding of scattering within each chamber. Two individuals from each chamber were assessed microscopically using confocal and backscattered electron imaging, to identify the histotaphonomic changes and their spatial relationships. The results indicate that different trajectories for disarticulation and body status at the point of interment may shed light on burial practices i.e., was the body intact at the point of interment or not? This group exhibited no cutmarks, and so the commingling, which contemporaneously extended over a 300-year period of use, needs some discussion. The histotaphonomy indicated, in this case, that bodies were likely intact at the point of interment.

Bell, Martin (University of Reading UK)

[287] *Making One's Way in the World: Identifying and Dating Prehistoric Routeways*

Archaeologists focus on sites. This paper looks at ways of identifying patterns of habitual movement that made those sites part of a living landscape. It draws on paleoenvironmental evidence, ethnohistory from the American northwest coast and the microscale of human footprints. Patterns of movement by people and animals create structures within landscape, which influence the activities of subsequent generations and the perspectives from which they encounter and perceive landscape. Paths thus constitute a significant aspect of niche construction. Examples from British and European prehistory demonstrate that there are ways of identifying and dating prehistoric routes using the spatial relationship between monuments. Negative features, such as hollow ways, can be dated by their relationship to colluvial sediments from associated agricultural terraces using various scientific techniques (artifacts, mollusks, U-Series and OSL). The results challenge existing assumptions that the main prehistoric routes in Britain were ridgeways on hill crests. There is more evidence for the early origins of parallel systems of hollow ways crossing the grain of the landscape. It is proposed that these were associated with the activities of seasonal pastoralists. The paper outlines key themes from the writer's recently completed forthcoming book *Making One's Way in the World*.

Beller, Jeremy (Department of Anthropology, University of Victoria.)

[121] *Raw Material Characterization and Lithic Procurement in the Azraq Basin, Jordan, During the Middle Pleistocene: Preliminary Results*

Recent excavations at Shishan Marsh 1 in the Azraq Basin, Jordan, have uncovered several artifact-bearing layers that date to the Middle Pleistocene. A paleoecological assessment of sediments from this period indicates predominantly warm and dry conditions in the region, similar to those of the present. Hominins living under these harsh conditions were forced to contract around a receding spring- and wadi-fed water source for subsistence. In this way, the distances they could venture to acquire resources were limited. Consequently, Shishan Marsh 1 presents the opportunity to investigate lithic procurement strategies practiced by Middle Pleistocene hominins in a water-stressed and arid environment. A macroscopic evaluation of the lithic assemblage revealed a nearly homogenous raw material composition with chert as the dominant stone type. A pilot provenance study of lithic sources in the region and a sample of artifacts are conducted using ICP-MS. The preliminary results indicate that local procurement of stone extracted material from predominantly one chert formation. The operation of the regional wadi-system as a potential secondary source are also considered, as it may have transported nodules toward the Azraq Basin.

Belli-Estrada, Francisco [218] see Robinson, Eugenia

Bello, Charles (Federal Emergency Management Agency [FEMA-DHS])

[394] *Introduction to session and opening remarks*

[394] *Chair*

Bellomia, Valeria (Sapienza, Università di Roma)

[347] *The Materiality of Sound: Detecting Performing Patterns on Two Mesoamerican Bone Rasps*

This presentation focuses on some results of an interdisciplinary study carried out on two scraping idiophones made of human bones from ancient Mesoamerica (omichicahuaztli). Both the instruments are today on exhibit at the Museo Nazionale Preistorico Etnografico "Luigi Pigorini" in Rome. The detailed analysis of the bone surfaces allowed us to reconstruct the taphonomic processes that affected the bones and the steps employed to transform them into musical instruments. Our research team organized marks into an operational stratigraphy, reconstructing the sequence of stages in production and use: raw material procurement, cleaning, shaping, decoration and finally use-wear patterns. Marks related to this last stage were useful in detecting the performing pattern of the instruments. Once we obtained these material data, we could play both the instruments in a recording session, using their original scraping tools, which are an Oliva shell and a human fibula. This allowed us to analyze the acoustic characteristics of the instruments and to replicate their sound in the exhibiting space, giving museum visitors the possibility to "listen to," and not only "look at," both the omichicahuaztli, although behind a museum glass.

Bellorado, Benjamin Aaron (University of Arizona)

[373] *Sandals from the Center Place, Footprints on the Pots: Continuity and Change in Twined Sandal Tread Designs from Chaco, Aztec, and Beyond*

Twined sandals were important components of Ancestral Pueblo ritual paraphernalia for a millennium. They were expensive and time consuming to make and many had patterns of raised knots woven into their treads that stamped footprints with complex geometric designs on the ground when worn. Scholars have postulated that twined sandals were likely used in communal rituals, dance performances, and even foot races. During the Pueblo II period, their use appears to have been connected with communal activities at Chacoan civic-ceremonial centers. After the collapse of Chaco, these sandal making and wearing traditions disseminated into disparate communities of the San Juan Basin, including the Middle San Juan. In this presentation, I discuss ongoing analyses of twined sandal collections, documenting continuity and variability of attributes of sandal shapes and tread design layouts from Chaco Canyon, Aztec Ruins, and other post-Chaco communities in the region. While few sandals have been dated absolutely, I compare sandal designs with well-dated Pueblo II-era decorative styles from painted pottery and other media to date them relatively. With this research, I hope to shed important light on how twined sandals functioned similarly or differently at these two centers of Ancestral Pueblo society (and beyond), over time.

Bellorado, Benjamin Aaron [60] see Gearty, Erin

Belmaker, Miriam (University of Tulsa) and Ekaterina Sevastakis (University of Virginia)

[244] *Taphonomic Analysis of the Small Mammal Assemblage of Hayonim E: Implications for Paleoecology of the Southern Levant During MIS 6*

This study presents the taphonomic history of the small mammal assemblage of Hayonim E, Israel, and compares it to those of other Middle Paleolithic (MP) sites. Levantine paleoecological changes during the MP have implications for hominin dispersal into the region. It has been suggested that a

comparison of faunal assemblages from Hayonim (160–130 Kya), Qafzeh (120–90 kya) and Amud (75–45 kya) indicate a shift between glacial and interglacial fauna which mirror dispersals by Neanderthals and modern humans. However, these analyses do not account for possible differences in the predator accumulating the fauna among the sites studied. Analyses of the taphonomic history is critical before inferring the paleoecology of the site and only sites that were accumulated by the same predator may be compared with rigor. Results suggest that the assemblage from Hayonim E and Qafzeh were accumulated by barn owls while the assemblage from Amud cave was accumulated by Eagle owls. Barn Owls (*Tyto alba*) take prey in proportion to its abundance in the environment and thus, fossil assemblages derived from this taxon are excellent indicators of the environment; although comparison among sites should only be done with caution, given their different taphonomic histories.

Belmar, Carolina (Dpt. Antropología, Universidad de Chile) and Andrea Troncoso (Dpt. Antropología, Universidad de Chile)

[232] *Residues Analysis of Bedrock Mortars of the Limarí River Valley (Ivth Region, Chile): Evaluating Plant Exploitation among Late Holocene Hunter-Gatherers*

For an integral understanding of bedrock mortars, as a product and producer of social practices, we have carried out research in the Limarí River valley (Chile) (Fondecyt Grant N°1150776). One dimension of this research was directed to answer the following questions: were these cupules used to grind plants? And if so, what plant resources were used by these hunter-gatherer groups? Do these include cultivate domesticated plants? And how does it relate to the association “initial pottery/horticultural practices” in the area. In an initial analysis we confirmed the grinding of local wild plants in five sites in the area and the presence of starch grain of *Zea mays* in one site. Now we shall extend the morphological and residue analysis of the cupules of a total of 10 bedmortar sites. This consists in the recovery and identification of microfossil evidence in use residues of the cupules, plus the registration of the morphological attributes of the cupules. The objective is to reach a better comprehension of late Holocene hunter-gatherer groups of this area, and have an insight of their plant exploitation strategies, referred to the use of wild plants and the possibility evaluating the use of domesticated plants.

Beltran, Boris [131] see Saturno, William

Bement, Leland (Oklahoma Archeological Survey, OU)

[332] *Open-Air Camps of the Terminal Pleistocene and Early Holocene: An Introduction*

Open-air camps from the terminal Pleistocene and early Holocene pose significant challenges in excavation, analyses, and interpretation. This international symposium provides a formal setting to continue a series of discussions on site formation, analytical trends, and interpretations. Key topics include defining site boundaries, contemporaneity of activity areas, population estimates, and the possible effect of thresholds in the arrangement and longevity of site use. Of particular interest is the question of what is the diversity represented in site layout and function during this time period.

[332] *Chair*

Bement, Leland [332] see Carlson, Kristen

Bemmann, Jan (University of Bonn) and Susanne Reichert (University of Bonn)

[25] *Karakorum, Mongolia, a Complex Urban Site in a Nonurban Society*

It is undisputed that Karakorum was founded by the Mongol Emperor/Khan, saying this means we analyze a top-down planned large city in a non-sedentary, nonurban society. Therefore we will address the question of the layout of the city and the spatial organization. How are activities and people ordered, is there common space, what kind of infrastructure is provided by the city founders and how is it maintained during the nearly 200 years of the existence of the city. At which areas were landmark buildings erected, where did the emperors place public monuments like propaganda stelae, how did they use architecture as a symbol of power? Are there any changes in the layout of the city, traces of decay? Was the master-plan of the city planners ever finished or do we see a rapid decline after the city lost its status as a capital? What criteria do we have to differentiate town quarters? Where are the cemeteries and are there any indicators for elite burials? Share locals and foreigners the same cemetery or has each ethnic or religious group its own cemetery? What social status did the inhabitants have and where did they come from?

Benden, Danielle (University of Wisconsin-Madison)

[2] *Discussant*

Bender, Morgan (California State University, Los Angeles), Amira F. Ainis (Department of Anthropology, University of Oregon), Victoria Scotti (Department of Anthropology, California State University) and René L. Vellanoweth (Department of Anthropology, California State University)

[300] *Collection of Crustaceans and Echinoderms during the Middle Holocene on the West End of San Nicolas Island, California*

We present the preliminary results of crustacean (crab) and echinoderm (sea urchin) remains from CA-SNI-40, a large Middle Holocene (~4440–3650 cal BP) dune site located on the West End of San Nicolas Island, California. Our study provides detailed identifications and quantitative analysis of crab and sea urchin remains that will contribute to previous faunal studies at this site, which identified over 88 shellfish taxa including dietary and non-dietary species. Preliminary results indicate that seven taxa of crab (*Brachyura*) and two indistinguishable species of sea urchin (*Strongylocentrotus* spp.) are present in fairly high densities. A dense urchin lens is present throughout much of the site, indicating that people harvested this resource in extremely high numbers during the time of occupation. We compare density values based on weight and minimum number of individuals (MNI) between two excavated loci to examine differences in harvesting patterns at this site. Morphometric measurements of crab dactyls indicate that people were collecting specimens of all age classes from littoral and kelp forest habitats. Our results suggest that the marine ecosystems on the West End of San Nicolas Island served as a productive and diverse site for human harvesting during the Middle Holocene.

Benedetti, Michael [165] see Haws, Jonathan

Benfer, Adam (University of Calgary)

[296] *Faring the Sweet Sea: Simulating Prehispanic Raft and Canoe Navigation in Lake Cocibolca, Nicaragua*

Before 1492, the human communities that inhabited the shores of Lake Cocibolca in Central America engaged in dynamic interactions and exchange networks, traveling across the land and canoeing or rafting on the lake and rivers to trade goods and communicate with their neighbors. Evidencing this travel network, archaeological studies have documented an abundance of ceramics and carved stone that the past inhabitants of the Lake Cocibolca region produced and traded widely during the later prehispanic periods (AD 300–1550). To shed light on this interaction and exchange network, I use a geographic information system to predictively model the optimal aquatic communication routes among the nearshore and island-based settlements of this lake. This model utilizes seasonally averaged environmental variables of surface current and wind patterns and cultural variables of navigator skill,

vessel shape, and propulsion method to simulate a series of lacustrine voyages. Through this model, travel times and probable routes are estimated. These simulations indicate that Lake Cocibolca is navigable by dugout canoe and raft under average conditions and it is likely that canoe travelers would have taken advantage of the prevalent current and wind patterns to contact their neighbors via this large freshwater lake.

[296] *Chair*

Bengtson, Jennifer (Southeast Missouri State University), Jodie O’Gorman (Michigan State University) and Amy Michael (Michigan State University)

[185] *Life during Wartime: Children, Violence, and Security at Morton Village*

Children are not immune to the violence of war. They can be incidental victims, prime targets, active participants, beneficiaries of fierce protection, or the recipients of warfare-related symbolic action. Though not subject to the same high rates of violent trauma as their adult counterparts, the available osteological data show that a small number of children interred in the late prehistoric Norris Farms #36 cemetery in Fulton County, Illinois did suffer traumatic injuries, both fatal and nonfatal. Some children were victims of scalping, while at least one was potentially the recipient of a human trophy as part of associated mortuary ritual. We revisit the osteological and mortuary evidence for children’s involvement in warfare at Norris Farms #36 and seek to contextualize it within the ethnographic literature on childhood in times of war. We also consider the somewhat obvious observation that some individuals in this skeletal series—including most children—bear no osteological evidence of physical violence. Consequently, we broach the concept of security as we consider children’s day-to-day lives at the associated Morton Village site and the broader landscape; How might this community have created secure spaces for the physical protection of children and other vulnerable people in the face of danger?

Benjamin, Derek [394] see Ngirmang, Sunny

Bennett, Gwen (McGill University, Depts. of Anthropology and EAS)

[25] *The Archaeological Study of Cities in East Asia*

This paper explores the study of cities in China and the implications for their archaeological investigation. Walled settlements developed in China during the Neolithic and by the Bronze Age many had already grown to considerable size and complexity. While scholars in China and East Asia often consider cities to be a form of settlement organization starting at this early date, the concept of city used in their study is frequently unexamined, and historical examples of cities in the Chinese heartland are used as models to understand earlier sites, or sites outside of this region that may have developed differently or had different uses. These long-held concepts of what premodern cities were and who lived in them developed from the study of rich historical documentation but have now come to limit understandings of cities by constricting the available range of interpretation.

Benson, Erin [228] see Campbell, Sarah K.

Bentley, Heath (Texas State University), Lauren Sullivan (University of Massachusetts/Boston) and James Garber (Texas State University)

[370] *An Analysis of Historic Glass Containers from St. George’s Caye, Belize*

From 2009 to the present, an abundance of whole and partial glass bottle remains of various types have been recovered throughout excavations on St. George’s Caye, Belize. Much of the glass collection has been found within the island’s cemetery among an assemblage of various other historic artifacts. The majority of the bottles and bottle fragments have been identified as eighteenth- and nineteenth-century English cylindrical bottles. In 2016, analysis of this assemblage commenced in order to determine a date range for manufacture of the bottle sample using analysis methods designed by Jones (1986) and Carillo (1973) to estimate manufacture date through measurement. Jones and Carillo’s methods were used to date six whole dark green glass cylindrical bottles that have been recovered from the island. Bottle base and finish fragments have been dated based on physical indicators of style and method of manufacture present on the bottle fragments as described by Jones (1986). This evaluation includes lip to string lip ratio, lip and string rim style and style of base and pushup among other features. The results of this analysis will help to provide a relative date range for the deposit of the assemblage from the cemetery at St. George’s Caye.

Benyshek, Tasha and Paul Webb (TRC Environmental Corporation)

[160] *Mississippian Occupations at the Ravensford and Iotla Sites*

Recent large-scale excavations at the Ravensford and Iotla sites, and elsewhere in western North Carolina’s Cherokee “heartland,” have documented Mississippian components that include architectural remains as well as artifact assemblages. But while Late Mississippian occupations have been found on many sites, Early and Middle Mississippian households and settlements have been difficult to isolate. Increased numbers of systematic surveys and excavations in recent years have uncovered evidence of these less visible occupations. Early and Middle Mississippian phases in western North Carolina have not been formally defined, but include both Early Pisgah and Etowah related phases. Mississippian influence appears to have been present during Early Pisgah in the form of flexed pole architecture, use of shell tempered ceramics, and maize agriculture. No evidence has yet been recovered that mounds were built during the Early Pisgah phases. By the Early Qualla phase, which includes later Pisgah ceramics, all of the hallmarks of Mississippian culture appear to be present. It is unclear if a chiefdom level of sociopolitical organization was present, however, and individual Mississippian towns and associated dispersed communities in the mountains may always have been relatively independent, as was true of the later Cherokee towns.

Berdan, Frances (California State University San Bernardino)

[225] *Discussant*

Berenguer, José [134] see Nielsen, Axel

Berger, Elizabeth (UNC-Chapel Hill)

[279] *Oral Health in the Middle Yangshao Guanzhong Basin*

The Middle Yangshao cemetery at Yangguanzhai is the first cemetery of this period ever found in the Loess Plateau of China. This paper presents the results of an analysis of the oral health of this population, which found lower rates alveolar abscesses, occlusal wear, antemortem tooth loss, caries, calculus, and linear enamel hypoplasias than would be expected in a typical Neolithic agricultural population. This sheds light on the diet of the Yangguanzhai population. The paper also places the results in comparative perspective with other populations of Central and Northwest China.

[279] *Chair*

Berger, Elizabeth [115] see Chen, Liang

Berger, Martin (National Museum of World Cultures, The Netherlands)

[267] *Turquoise Mosaic Skulls: Understanding the Creation of an Object Type*

In 1932, Alfonso Caso and his team found a human skull decorated with turquoise mosaic tesserae during their well-known excavation of Monte Albán's Tumba 7. To this day, this is the only artifact of this type to have been found in a documented excavation. Nevertheless, at least twenty turquoise mosaic-decorated human skulls are currently held in museums and private collections. Many of these have been considered forgeries, others are considered authentic. Within this group, there are clear iconographic and stylistic differences, an indication that these 'mosaic skulls' were not all made by the same original culture, or forger. In this presentation, I will present an overview of the corpus of mosaic skulls known to date and trace their object biographies. Through this study of provenance and iconography, I will try to answer the question "Are mosaic skulls a twentieth century invention, or are they a genuine Mesoamerican artifact type?"

Bergersen, Ove [224] see Martens, Vibeke Vandrup

Bergin, Sean (School of Human Evolution and Social Change, ASU), Salvador Pardo Gordó (Department of Prehistoria i Arqueologia, Universitat de València), Michael Barton (School of Human Evolution & Social Change, Arizona), Joan Bernabeu Aubán (Department of Prehistoria i Arqueologia, Universitat de València) and Nicolas Gauthier (School of Human Evolution & Social Change, Arizona)

[38] *Testing Social and Ecological Drivers for the Initial Spread of Agriculture on the Iberian Peninsula*

Much initial research into the arrival and dissemination of agriculture in Europe has focused on identifying the speed and direction of the arrival of Neolithic subsistence. More recent work has begun to examine the chronological and spatial patterning of the spread of agriculture with the goal of identifying important sociological or environmental factors that affected the timing and location of agricultural settlement. In this context, agent-based computational modeling is emerging as a sophisticated platform from which to test social and ecological drivers for the neolithization of Europe. In this case study, we use the Iberian peninsula as the setting for a computational model of Neolithic spread in order to test multiple processes that have been proposed as mechanisms for the spread of agriculture in Europe. The inclusion of state-of-the-art crop models, based on downscaled paleoclimate models allow us to more accurately simulate ecological conditions that individuals or groups may have favored when establishing a settlement in a new location. The results from these computational hypotheses are evaluated against a high resolution chronological dataset for the arrival of agriculture to the Iberian peninsula. The integration of paleoenvironmental and conceptual models provides a unique perspective for the evaluation of Neolithic spread mechanisms.

[268] *Discussant*

Bergsvik, Knut Andreas (University of Bergen, Norway)

[68] *The Ambivalence of Caves and Rockshelters in Medieval Norway*

Caves and rockshelters occur frequently in Norway and they were extensively used as dwelling-sites for humans in most periods of the prehistory. During the transition to the medieval period (AD 550–1500), however, archaeological excavations show that their use changed significantly. From then on, they mainly served as offering sites, burial sites and as workshops for metal smiths and stone masons. This change may have been related to a change in the perceptions of caves and rockshelters. One gets a glimpse into these later perceptions when studying the medieval saga texts and eddic poetry from Iceland. In these texts, there is a marked ambivalence concerning these places. Caves are, on the one hand, portrayed as scenes for negative actions and incidents, and are associated with dangerous and threatening beings and powers in the Norse mythology. On the other—when people communicate with these beings—caves and rockshelters are places where wisdom, wealth, and status can be achieved. It is argued that the ambivalence led to a general avoidance of the shelters for dwelling purposes, and to a favoring of them as arenas for worship and ritual.

Berman, Mary Jane [395] see Gnivecki, Perry

Berna, Francesco (Department Archaeology, Simon Fraser University)

[338] *Site Formation Processes at Manot Cave, Israel*

Manot Cave, represents today one of the richest Upper Paleolithic assemblages in the Levant. The site has produced a 55,000 year old anatomically modern human skull, as well as Middle Paleolithic to Post-Aurignacian lithic and bone artifacts. The rich assemblage is found in an "unusual" situation, with an in situ occupation area at the top of a talus and close to a currently blocked entrance. The occupation area defined by in situ combustion features is replete with artifacts, and so is the talus slope. Understanding this site requires a basic untangling the processes responsible for the formation of the talus slope, in addition to the occupation area. Here we present the results from an extensive microarchaeological investigation and high resolution 14C dates conducted in several excavation areas.

[338] *Chair*

Berna, Francesco [354] see Wiebe, Matthea

Bernabeu Aubán, Joan [38] see Bergin, Sean

Bernal-Casasola, Darío

[378] *Rome and Cetaceans: Archaeological Evidence from the Strait of Gibraltar*

Over the past 10 years, bones from whales and other marine mammals have been uncovered from archaeological excavations of Roman cities around the Straits of Gibraltar (Baetica and Mauritania Tingitana coasts). The high frequency of archaeozoological remains and their location within fish-preserving contexts (cetariae) has suggested the active exploitation of cetaceans throughout the Roman Imperial period (II BC–V AD). This paper reviews the evidence from Baelo Claudia, Iulia Traducta, Septem Fratres and Tamuda, the sites from which the majority of the finds are located, and where the use of salted whale meat and other products has been proposed within fish-salting factories, as noted by some classical authors (Galen, among others). This is the area of the Atlantic-Mediterranean region in which the most archaeological, zooarchaeological and iconographic evidence has been documented, and which is currently being investigated to demonstrate that whaling, traditionally attributed to Basque in the Cantabrian in the Middle Ages, began in classical antiquity.

Bernard, Henri (Université Paris 1 Panthéon Sorbonne) and Sara Ladrón de Guevara (Universidad Veracruzana)**[3]** *Olmecc Masks in the Region of Arroyo Pesquero*

In a detailed analysis of some figurines of the offering 4 of La Venta, we observed that some of them were carved wearing a mask. This is hardly visible because the representation of the mask is a realistic human face. It seems to have a close relationship with the stone masks found a few kilometers from La Venta, in the site of Arroyo Pesquero, Veracruz, a site of Olmec offering reported in 1969 by the archaeologist Manuel Torres where a lot of lithic material was discovered. Among these there are axes, figurines and masks of stone, which reproduce realistic human faces with particular characteristics, as if they were trying to represent a particular individual. In other collections we have found identical trait in some figurines in Olmec style, which have the same representation as if they were wearing a mask. This evidence reveals the use of masks in rituals by living people and not just as part of funerary paraphernalia. What was the meaning of these masks? Are they related to a particular period and region? These are some of the subjects addressed in this presentation.

Bernard, Michael [394] see Guilfoyle, David

Bernstein, Bruce (Tribal Historic Preservation Officer, Pueblo of Pojoaque)**[34]** *Moving Ideas, Staying at Home: Change and Continuity in Eighteenth-Century Pueblo Pottery*

Sometimes staying in place requires movement. To stay in their precontact villages required that Pueblo people shift loci of cultural practice as well as reorder intellectual and material culture. New styles of pottery, including the adaptation of blackwares, quickly moved from one Rio Grande pueblo to the next. By the close of the eighteenth century, pottery changed and is adapted in its use for storing, preparing, and serving wheat-based foods such as oven-baked bread. The movement of new pottery styles might be understood as an adaptive strategy to keep villages intact. Although a precept of Tewa culture is movement, evidence suggests that seventeenth- and eighteenth-century Pueblo leadership believed that moving from established villages might permanently and irrevocably disrupt cultural continuity because Tewa culture is based on movement creating continuum rather than change. These are primarily sentient and stable cultural adaptation strategies rather than episodic or forced change as the older anthropological literature and researchers continue to suggest. The research utilizes historic and ethnographic data and museum collections along with archaeological collections from Tewa villages, a materiality record that documents Tewa worldview, adaptation, and survival—Tewa people's reaction and adaptation to Spanish introduced ideas.

Berón, Mónica [174] see Archila Montanez, Sonia

Berquist, Stephen (University of Toronto), Erick Casanova Vasquez (Universidad de San Marcos), Abigail Gamble, Samantha Seyler (University of Pennsylvania) and Steven A. Wernke (Vanderbilt University)**[75]** *Elite Domestic Spaces and Daily Life in a Reducción*

The archaeology of Spanish colonialism in the Andean region is coming into increasing focus with the documentation of Spanish colonial doctrinas and reducciones, along with the excavation of religious structures, public spaces, and elite and common indigenous households. However, we still lack a clear comparative diachronic perspective of how Spanish colonialism affected the daily lives and values of indigenous Andean peoples. This paper presents the results of the 2016 excavations of three large stone structures and two smaller associated structures in the Spanish colonial reducción of Santa Cruz de Tuti, in the Caylloma Province of Arequipa, Peru, occupied from the precolonial era until its abandonment in 1843. We argue that these compounds comprise the domestic spaces of kurakas, local chiefly authorities in both precolonial and Spanish colonial contexts. We present evidence that various of these spaces were in use from near the founding of the reducción in the late sixteenth century to its abandonment in the mid-nineteenth century. As such, our excavations yield valuable comparative data on the domestic lives of the elite indigenous classes of Spanish Colonial Peru and their changing values, lifeways, and bodily habitus over the course of Spanish Colonialism and into the early Republican period.

Berres, Thomas**[385]** *Bear Imagery and Ritual in Midwest North America*

The American black bear figured prominently in the visual arts, rituals, ceremonies, and cosmological beliefs of Native peoples inhabiting Midwest North America through antiquity. Bears are almost universally perceived as great Lower World spiritual beings possessing the power to cause or cure illness, maintain life, and change its form where bears become people and vice versa. Their remains and images are often found in mortuary ritual contexts—a powerful means of communicating emotions and central themes of the culture. Drilled bear canines (metonymies of power) and effigy pipes occur in such traditional religious contexts. The importance of the black bear's head in ceremonies and rituals is documented in the historic and archaeological record, which involved the consumption of brains at feasts, public display of skulls on poles, and use of skull masks at ceremonies. Late Woodland Period (1400–750 BP) bear effigy mounds also provide visual aesthetic evidence of group identity and cosmological beliefs, indicating that monumental architecture (like all Native art) cannot be separated from religious practices. This study provides archaeological evidence of religious traditions shared cross-culturally in antiquity regarding the bear, which elicited power over the human imagination and spirit.

Berry, Alexander**[46]** *Sea Level Fluctuations of the Southern Salish Sea: An Assessment of the Archaeological Potential for Sites Dating from the Last Glacial Maximum to the Holocene*

Following the last glacial maximum, coastlines around the world drastically changed. This occurred through a complex combination of geomorphological processes, which were compounded by global sea level rise. While these fluctuations took place, humans adapted to an aquatic subsistent lifestyle along coastal regions. This study focuses on the southern Salish Sea (located in North America's Pacific Northwest) and human-environmental interactions during the terminal Pleistocene. Through the use of a predictive model (reevaluated for international application), a holistic methodological framework developed in the Baltic Sea was utilized to address questions regarding archaeological potential in the southern Salish Sea. A dataset was compiled incorporating environmental, ethnological, and archaeological information—for an analysis of the region and its inhabitants. This data enables the production of paleo-landscape reconstructions at 14,000 BP, 11,000 BP, and 6000 BP, which illustrate the prehistoric coastal configurations influx caused by sea-level fluctuation. Concluding from this research, the sea-level history of the southern Salish Sea is defined in accordance to the amount of dynamic change that has occurred over the past 14,000 years. With precontact sites ranging from inland to completely inundated, the data provided in this study yields information regarding the varying degrees of Paleoindian and Archaic archaeological visibility.

Berry, Meg (Centre for Rock Art Research and Management—University of Western Australia)**[175]** *It's All a Bit Retro: Investigating Early Phase Rock Art on the Dampier Archipelago, Northwest Australia*

Murujuja, located off the northwest coast of Australia, possesses one of the largest and most vibrant open-air rock art galleries on the planet. On Murujuga, low erosion rates, durable geology, and growing evidence from the wider region has allowed for archaeological contextualization of rock art

into deep time; giving researchers the opportunity to investigate both the changing social dynamics of groups and the stimuli for this change over thousands of years. The main objective of this paper is to report on the findings from research undertaken over the past three years within the ARC funded Dynamics of the Dreaming Project investigating how early cultural lifeways on Murujuga are evident in the associated rock art phases; and to examine shifting social geographies during periods of extreme social and environmental pressure. Through the tethering of a stylistic analysis focused on rock art motifs associated with early phase rock marking on Murujuga, with archaeological, social, and chronological indices this paper aims to illustrate and discuss how rock art evolved and was mobilized within the natural and social landscape throughout time.

Bérubé, Éloi (McMaster University), Shanti Morell-Hart (McMaster University) and Sophie Reilly (McMaster University)

[22] *Arts and Sciences of Ancient Plants at McMaster University*

Since 2013, the McMaster Paleoethnobotanical Research Facility (MPERF) has explored questions surrounding the relationship between humans and plants, including plant cultivation and collection, consumption and social uses of flora, and interactions between people and landscape. Active projects address human-plant dynamics throughout different regions of Mesoamerica, South America, and Ontario, at time periods ranging from the Late Pleistocene through historic periods. With recent support from the Canada Foundation for Innovation, laboratory work has turned toward refining techniques for microbotanical analysis and applying Raman spectroscopy to botanical residues. This presentation centers on the study of macrobotanical and microbotanical remains to address three foci: meal production and everyday practices in the Late Formative Lake Titicaca basin of Bolivia; foodways and ethnoecology at Southeastern Mesoamerican sites; and changes and continuities in Mixtec lifeways during the Early Spanish Colonial period at the site of Achiutla in the Mixteca Alta region of Mexico. We highlight collaborations with broader networks and institutions, as well as the ongoing training in paleoethnobotanical techniques and interpretative strategies currently taking place at the MPERF. These efforts fit into a long tradition at McMaster of the application of novel methodologies in archaeological sciences to answer social questions.

Bestel, Sheahan and Tianlong Jiao (Denver Art Museum, USA)

[229] *Plant Residues from the Pre-Austronesian Tanshishan site (c. 4300 BP) and Their Interpretation*

A mid-Neolithic expansion of farming cultures into the coastal areas of Fujian province, located opposite Taiwan on the other side of the Taiwan Strait, occurred around c. 4300 cal BP. Crops including foxtail millet and rice formed part of these farmers' diet, and plant remains such as bamboo, possibly used for wooden cooking implements, were also common in sediments and residues at these Longshan-period sites. Plant residues from pottery fragments excavated from the Tanshishan site, located in Fujian Province, eastern China, have the potential to shed light on the subsistence and diet of the proto-Austronesian seafaring people who occupied Taiwan and subsequently spread across parts of the Pacific and into Australia. Despite the suggested ancestry of the Tanshishan culture to proto-Austronesian sites such as Damaoshan and Huangguashan, plant remains recovered from the proto-Austronesian sites were poor and crops were difficult to identify. The implications of the results from the research on residues and plant remains on the public understanding of Austronesian origins will be discussed.

Bethke, Brandi (Oklahoma Archeological Survey)

[127] *Domesticated Animals as a Source of Cultural Change during the Contact Period on the Northwestern Plains*

Despite functioning as pack animals, guards, religious figures, and even companions, dogs were never as integral to Blackfoot culture as the horse became. To date, researchers have most often characterized the relationship of Blackfoot people and their horses by framing the horse as an "upgraded model"—a "new and improved" dog. While prior experience with domesticated dogs did facilitate the incorporation of horses into the daily lives of Blackfoot people, this paper argues that the fundamental differences between dogs and horses prove to be one of the greatest sources of cultural change between the pre- and postcontact periods. Through a framework that integrates archaeology, history, and contemporary ethnography this paper will identify these key differences in order better understand how the horse fostered new and dramatically different conceptions of domesticated animals that in turn had significant effects on the value of dogs within equestrian Blackfoot culture.

[127] *Chair*

Bettencourt, Luis

[277] *The Intellectual History of Settlement Scaling Theory*

There is a long history of comparative empirical studies of settlement sizes in relation to evidence relating to nature and scope of built environments and human socioeconomic activities. However, only recently have consistent theories of settlements been developed that yield specific predictions that can be tested against archaeological evidence. In this paper, I present a brief intellectual history of these ideas to show how they incorporate concepts from various disciplines with an emphasis on archaeology and sociology, as well as urban economics and geography. Specifically, I will show how ideas of socioeconomic "agglomeration," developed originally to explain modern cities and interpreted in light of social activity over built spaces, have a much larger scope and provide a general logic that can be tested in any settlement system throughout history. Archaeological evidence in favor of such theoretical predictions allows important inferences about the structure of social networks of communication and exchange between people and their intensity and efficiency in specific places and times. These ideas also provide connections to mechanisms of cultural evolution and "economic growth" in ancient societies, such as the division of labor and knowledge in settlement systems, and lead to new uses and interpretations of archaeological evidence.

Bettinger, Robert (University of California-Davis)

[286] *Discussant*

Bettinger, Robert [99] see Morgan, Christopher

Bettis, E. Arthur [342] see Doershuk, John

Betz, Barbara (Ohio State University) and Jessica Pearson (University of Liverpool)

[73] *Recontextualizing the Dead: A Geospatial Approach to Synthesizing Bioarchaeological Data at Çatalhöyük*

Two decades of excavation at Çatalhöyük have produced a skeletal assemblage of approximately 555 individuals from primary, secondary, and primary-disturbed Neolithic (7100–6000 cal. BCE) deposition contexts. As personnel and digital technology have changed, integration of the large body of legacy bioarchaeological data with current research has posed many challenges. Often, analyses of osteological data patterns have relied on broad comparisons of temporal and spatial categories drawn from nominal data in the site database, such as comparisons between individuals buried within different types of houses, or groupings of earlier and later stratigraphic layers. However, as Geographic Information Systems (GIS) software has been incorporated into site-wide research methodologies, new opportunities have arisen to explore more fine-grained geospatial patterns in the skeletal record

at Çatalhöyük and provide new insights into diet, nutrition, disease, growth, development, and other aspects of life and death at this complex Neolithic settlement. This study explores the benefits and challenges of using GIS to integrate legacy data from the site database, (i.e., age, sex, and long bone measurements), with recently collected data, such as dietary isotope results and dental stress indicators, to develop new understandings of demographic and osteological patterns based on spatial visualization and tools of geospatial analysis.

Bevan, Andrew [58] see Li, Xiuzhen

Bewley, Robert (University of Oxford, School of Archaeology)

[70] *Basket Case? Finding Funding for Archaeological Projects: A European Perspective*

The competition for funding is increasing, as demand increases but the sources of funds diminish, especially if there is a research element in any proposed project. This paper will explore the possible routes for funding and the potential and pitfalls of using a "basket" approach to raising funds for archaeological projects in the public sector (i.e., charities and noncommercial), including universities. It will also look at different approaches for funding significant heritage-based projects (including national lotteries). I will also briefly use the Endangered Archaeology in the Middle East and North Africa Project as an example of what can (and what can't) be achieved.

Bey, George J. (Millsaps College), Stephanie Simms (California Digital Library, University of California) and Betsy Kohut (Millsaps College)

[5] *2000 Years of Eating: Continuity and Change in Food Practices Among the Puuc Maya*

This paper examines the evidence for what and how the Maya of the Puuc region ate during the long history of occupation of this region. Data collected from almost two decades of research by the Bolonchen Regional Archaeological Project and covering close to two millennium of occupation are used in this exploration of eating. Household archaeology primarily from the site of Kiuc and the suburban site of Stairway to Heaven, and ceramic data from throughout the BRAP study area provide insights into continuities and change during the Maya occupation of the Puuc region. Among the most important findings is the evidence for dramatic changes in daily practices of eating that took place from the Preclassic to Classic periods at the household level. These changes are argued to reflect significant differences in how Preclassic and Classic Maya saw their social relations between themselves, other family members and the larger social world. Ethnographic data and comparative archaeological data are used to further examine what these patterns in Maya ceramics may mean.

[67] *Discussant*

Bey, George J. [101] see Seligson, Ken

Beyer, Autumn (Michigan State University), Terrance Martin (Curator Emeritus of Anthropology, Illinois State M) and Jodie O'Gorman (Michigan State University)

[299] *Power and Purpose: The Role of Animals in Ritual Context at a Mid-Continental Site in the Fourteenth Century*

A variety of ritual contexts are documented at the Oneota and Mississippian Morton Village site and the associated Norris Farms Cemetery in Fulton County, Illinois. These include multi-scalar mortuary contexts, communal ritual structures, and smaller domestic-related facilities. Animal remains from both food and faunal tools, along with artifacts that are imbued with animal symbolism, were found in each context. This paper explores the variability and looks for patterning of animal use within these ritual contexts to better understand the linkages between animals and religion within a social context of ethnic interaction and cultural negotiation.

Beyin, Amanuel (University of Louisville), Hong Wang (Illinois State Geological Survey, Prairie Research), Mary Prendergast (St. Louis University, Madrid) and Katherine Grillo (University of Wisconsin—La Crosse)

[146] *Terminal Pleistocene and Early Holocene Settlements in West Turkana (Northern Kenya): New Radiocarbon Dates*

Lake Turkana in northern Kenya has played a central role in generating archaeological and paleoclimatic datasets relevant to studying key transitions in human prehistory. Generally, despite its rich Plio-Pleistocene hominin fossil record, the later prehistory of the basin, particularly the period between 50 and 10 ka, remains comparatively underexplored. In this paper, we discuss new radiocarbon dates from two recently excavated sites in West Turkana, namely Kokito 01 (GcJh11) and Kokito 02 (GcJh12). The sites span the terminal Pleistocene and early Holocene (14–10 ka), a time of substantial ecological and cultural changes globally. Site chronologies are interpreted with reference to fluctuating lake levels during the African Humid Period. Well-dated sites from this timespan are scarce in the Turkana Basin, and the new radiocarbon dates are important for establishing human settlement history and associated cultural developments in the region during shifting climatic conditions at the Pleistocene-Holocene transition.

Bezy, Philippe

[347] *Maya Shell Trumpets: An Interpretative Pivot*

For the ancient Maya, the use of music was often depicted as central to ritual activity. One of the longest lasting instruments, the shell trumpet, provides ample material for analysis. My three-pronged interpretive approach is made possible by the shell's use in ancient ritual contexts, its appearance in Classic era iconography, and its organic origins. Archaeologically provenanced trumpets, for example, yield deposition data, while art historical methods address both unprovenanced trumpets and their depictions in Maya art. Malacological information about marine mollusks and their ecological niche offer a supplementary layer to interpretative efforts that impacts our understanding of ancient Maya shell selection. The conjunction of the three approaches emphasizes the ritual function shell trumpets fulfilled and further indicates an association between specific species and specific ritual practices. What is more, some examples suggest a concerted effort to coordinate the species chosen with other ritually important components like directionality and color.

Biagetti, Stefano (CaSEs—Univ. Pompeu Fabra [Barcelona, Spain])

[57] *Remote Sensing for Late Holocene Archaeology in Central Sahara: A Multi-Scalar Approach*

At the end of the African Humid Period (c. 5,000 years ago), the Sahara became dry. Yet, in spite of the onset of current arid conditions, human societies found successful strategies to cope with reduced rainfall and patchy natural resources. Archaeological evidence from the arid Sahara, dated from the last five millennia, can be studied by means of Earth Observation techniques. In this paper, we will present the results of our research from central Sahara, aimed at the remote reconstruction of the geomorphology, environment and archaeology of selected areas. We will focus on multiple-resolution remote sensing based upon multispectral and panchromatic imagery (e.g., Corona, Landsat, ASTER, Worldview) to understand the development of cultural trajectories in arid lands, complementing data collected from previous fieldwork and implementing the knowledge of currently inaccessible areas.

[314] *Discussant*

[57] *Chair*

Biagetti, Stefano [57] see Conesa, Francesc C.

Bianchini, Paola Cortez [384] see Miller, Paul R. M.

Bicho, Nuno (Universidade do Algarve) and João Cascalheira (ICArEHB—Universidade do Algarve)

[389] *A Critical Review of the Meaning of Short-Term Occupation in Early Prehistory*

One of the main elements in prehistoric research is the study of settlement patterns. In the last five decades, stemming partially from Binford's research on the topic, the idea of settlement is based on site typology, including the traditional residential and logistic concepts. The latter is certainly marked by the notion of short-term occupation. This concept, used freely by many archaeologists, tends to rely on two main ideas—that of an occupation lasting a short span of time, and subsequently resulting in a limited amount of material culture. Our aim, based on various archaeological case studies from the Stone Age records of Portugal and Mozambique is to show that neither idea is necessarily correct (i.e., there may be short-term occupations with the production of large amounts of artifacts such as lithic workshops; there might be very small collections, such as lithic caches, resulting from short occupations but with very long uses of the site; and most times both are hardly differentiated within complex palimpsests). We will present a critical review of the definition of short-term occupation in Prehistory and will try to define both the criteria for definition and the concept of short-term occupation in the archaeological record.

Bicho, Nuno [154] see Goncalves, Celia

Bidmead, Julye (Chapman University)

[136] *Ritual Power and Politics in Mesopotamia*

In times of political and societal instability public ritual acts as a stabilizing force. During the first millennium BCE with the rise and collapse of several powerful empires, ancient Babylonia witnessed much of this political turmoil and instability. Kings of each succeeding empire appropriated long-established Mesopotamian religious ideology to cast themselves as divinely selected rulers. They manipulated the celebration of the akitu, a twelve-day religious New Year's festival, to legitimize and gain popular support for their rule and to stabilize a declining society. Despite the social and economic problems facing a collapsing empire, political power expressed via the religious rituals of the akitu festival, displayed the new ruler's ideology as divinely sanctioned, and therefore normative to Mesopotamian society.

Biehl, Peter F. (SUNY Buffalo) and Arkadiusz Marciniak

[95] *The Entanglement of Nature and Culture in the Neolithic and Chalcolithic of Central Anatolia: The Transition of Çatalhöyük East to West*

Prehistoric communities need to be seen as firmly embedded in their ecosystem and landscape where the nature is a very real factor in the decision making processes. The human-environmental relationship is complex and nonlinear, which different societies shape it in variable ways. Responses to nature are always of social character made of a number of intertwined explicit and implicit elements. They ultimately have far reaching consequences for the condition of any group including a survival in the face of food shortage or lack of critical resources. The entanglement and nature and culture becomes particularly complex in a period of climate change such as the 8.2k cal BP climatic event. This paper argues that how humans respond to climate change plays a crucial part in the formation of society. Çatalhöyük offers a microcosm that may help us unlock some of the key questions surrounding the period of the transition from the East to West mound around 6000 cal BC. By revealing the entanglement of nature and culture on a microscale, the paper aims to investigate the character of this major threshold in the development of Anatolian societies of that period from a hitherto unexplored perspective.

Biehl, Peter F. [371] see Vandam, Ralf

Biggie, Michael [369] see Walden, John

Bigham, Abigail [219] see Breidenstein, Abigail

Bikoulis, Peter [233] see Gonzalez-Macqueen, Felipe

Bill, Cassandra (Middle American Research Institute)

[71] *Material Culture Correlates of Polity Restructuring and Decline: Changes in Ceramic Production and Use at the End of the Late Classic Period in the Copan Valley*

Features of material culture can be actively constructed and transparently manipulated to various sociopolitical ends, with the installation of elaborate monuments and possession of ornate goods making bold statements of power and authority. While other more common elements of material culture may provide perhaps less conspicuous commentary on the "state of the union," they can also be equally symbolic of the conditions under which they were created. This paper examines the material culture (specifically, ceramic) correlates of the Copan polity's decline at the end of the Late Classic period and what specific patterns of ceramic production, distribution and use may reveal about the effects of the sociopolitical, economic and demographic changes that characterize this era of Copan's history.

Bill, Cassandra [39] see Bell, Ellen

Billinger, Michael (Institute of Prairie Archaeology, University of Alberta) and John W. Ives (Institute of Prairie Archaeology)

[339] *Insights into Prehistoric Footwear Landscapes*

In earlier research, we used Promontory moccasins dimensions to chart predictable relationships concerning moccasin length, foot length, stature and age. A high proportion (83%) of the discarded moccasins in the Promontory caves came from children and subadults. While a discard bias concerning adults males (more likely to discard moccasins outside of domestic contexts) must be acknowledged, the predominance of children and subadults suggested the presence of a growing population, consistent with other data suggesting that Promontory Culture peoples flourished in comparison to their terminal Fremont neighbors. The precision of the Promontory formulae in predicting stature and age from moccasins can be employed in assessing site

function for a variety of footwear instances, including the Yukon ice patch moccasin from an area in or near the Proto-Athapaskan homeland, Franktown Cave in Colorado, Kenton Caves in Oklahoma, and Ross Rockshelter and Daugherty Cave in Wyoming. We also contrast our findings with other large assemblages of footwear, including sandals from Antelope House in Arizona. The presence of children or subadults informs our understanding of the nature of different sites, suggesting occupations by small residential groups in some cases and individual larger moccasins consistent with migratory activities like adult male scouting in others.

Billman, Brian (UNC and MOCHE, Inc.)

[147] *Discussant*

Billman, Brian [222] see Bardolph, Dana

Billo, Evelyn

[273] *Rock Art Site Protection: Lessons Learned in 50 Years of Trying*

The shared attributes of two successful rock art site preservation projects near metropolitan areas will be discussed. They started with different backgrounds. The Adams School Site (now Chitactac-Adams Heritage County Park) in California was a neglected and vandalized park whose property had been donated. Picture Canyon (now Picture Canyon Natural and Cultural Preserve) in Arizona was neglected State Trust land being used as an illegal dump that needed to be purchased to become a preserve. Both projects benefited greatly from proactive public servants and volunteers who were dedicated to preservation goals. They partnered with Native American communities, documented their resources first, worked with conservators, and held public meetings to educate the stakeholders. They applied for grant funding, met with decision makers on all levels—local, state, and federal, and had perseverance to jump through all legal hurdles. Picture Canyon benefited from a successful National Register of Historic Places nomination, and matching grants from Arizona Growing Smarter and Flagstaff Open Space funds, while Chitactac-Adams benefited from an Intermodal Surface Transportation Act grant. Projects that failed were located within multiple jurisdictions where no one took the lead, had a lack of funds, and/or people who cared.

[273] *Chair*

Binder, Michaela (Austrian Archaeological Institute, Vienna), Charlotte Roberts (Department of Archaeology, Durham University) and Neal Spencer (Department of Ancient Egypt and Sudan, British Mus)

[219] *Life in Times of Change: A Bioarchaeological Perspective on Health and Living Conditions in Upper Nubia in the Late Second and Early First Millennium BC*

With the end of the Pharaonic Egyptian colonial occupation c. 1070 BC and the increasing deterioration of climatic conditions, communities in Upper Nubia faced significant changes, both to the political structure (which may have affected trade networks), and to the agricultural potential of the region (e.g., availability of arable land). This presentation aims to elucidate if, and in what ways, these alterations impacted upon the living conditions of the people in the area, using the skeletal human remains from the cemeteries of the colonial administrative center at Amara West (N = 180). Analysis of markers of physiological stress and disease (stature, orbital changes, dental disease, nonspecific infection, respiratory diseases, endocranial changes, trauma, osteoarthritis), and oxygen and carbon isotopes, are complemented by contextual data drawn from the cemeteries, settlement and surrounding habitat. Despite limitations due to the bias in sample size, a systematic analysis reveals several tentative trends such as decreasing stature, increased levels of osteoarthritis, dental pathologies, pulmonary diseases, post-cranial fractures and higher subadult mortality. Embedded within the environmental, isotopic, historic and archaeological data, they point to an overall degeneration in living conditions of the population reflecting the impact of severe changes to the environmental, settlement structure and subsistence affecting the region.

Binning, Jeanne (California Department of Transportation)

[100] *Identifying Pressure Flakes in Lithic Assemblages*

Most lithic technologists would agree that pressure flakes cannot be reliably identified in debitage assemblages by their size and morphology. Analysts using fractography have had success identifying pressure flakes by determining crack velocity via microscopic features on the ventral surface. However, this technique is time-consuming and is most successful on glassy materials. Native Americans of the western continental United States, extensively used one pressure flaking technique for 8,000 years. This pressure flaking produces flakes that are diagnostic of the approach. The distinctiveness of these flakes provides a means of identifying pressure flaking in the Holocene archaeological record of the western United States.

Birch, Jennifer (University of Georgia)

[277] *Settlement Scaling in the Northeastern Woodlands*

In the late precontact Northeastern Woodlands, processes of aggregation, migration, and geopolitical realignment led to the formation of settlements which give the impression of being too large to be called villages but possessed organizational structures associated with segmentary societies. This paper utilizes empirical data generated from Iroquoian community plans to present a study of scaling relationships in Northern Iroquois. The results are then considered in the context of the historical development of Northern Iroquoian societies and ongoing considerations of how settlement scaling theory can be applied to aggregations in middle-range societies which were clearly not urban in scale.

Bird, Douglas [302] see Price, Michael

Birge, Adam (University of Texas at San Antonio)

[396] *Mapping Lines and Lives at the Sajama Lines, Bolivia: A Model for Ritualized Landscapes*

Ritual trails and geoglyphs in the Andes date back as far as 400 BC and are perhaps best represented in the Nasca lines and the ceques of Cusco. In western Bolivia, the Sajama lines are a network of ritual trails that cover an estimated 22,000 km² and connect pucarás, chullpas, villages, and chapels. Although this ritualized landscape was heavily modified during the Colonial (1532–1820) and Republican (1821–1952) eras, these pathways had prehistoric use by the local Carangas. These lines may have facilitated social and ritual behaviors but also allowed for negotiation of Spanish and Inca colonization. Understanding these pathways and their features and artifacts allows for inferences to be made about the creation and change of social, political, and ritual life. In this paper, I present a model for investigating the material remains of the Sajama lines that would allow it to be comparable to other ritualized landscapes. This model was based off of a pilot project in 2015 where I identified and surveyed a group of nine ritual pathways around the mountain of Nevado Sajama. This model will be applied to a larger sample of the Sajama lines in future fieldwork.

Birkmann, Joseph and Michael W. Graves**[346]** *Resiliency in Hawaiian Irrigated Agricultural Systems: A GIS Approach*

Precontact Hawaiian agriculturalists created irrigated cropping systems of considerable complexity across all of the Hawaiian archipelago. While many of these systems are concentrated in short but broad alluvial valleys, the windward coast of the big island of Hawaii presents a unique hydrological landscape. Here the geologic youth of the island presented Hawaiian agriculturalists with a landscape dominated by relatively small, narrow gulches with limited space for cultivation and a propensity for flooding. This paper examines issues of resilience and stability in small-valley irrigated agricultural systems using high-resolution lidar data and advanced techniques in GIS-based hydrological modeling. We will attempt to evaluate the role of extreme flooding events in influencing decision making and maintenance needs within the various drainages of the windward Kohala peninsula. In doing so we emphasize the utility of adopting a regional approach to landscape based analysis, as well as the analytic possibilities of high resolution GIS data for assessing ecological resiliency in agricultural systems.

[346] *Chair*

Birkmann, Joseph [302] see Graves, Michael W.

Bischoff, Robert (Brigham Young University)**[155]** *A Spatial Analysis of San Juan Red Ware Using Least Cost Paths*

A fundamental part of interaction is distance. Distance can be calculated in many ways. GIS applications allow the calculation of least cost paths between locations. Often the length of this path is used as the distance between points; however, the amount of time it takes to traverse a path may differ for paths with the same length that traverse different topography. In this poster, I use the distribution of San Juan Red Ware in a portion of the southwestern United States to examine the differences between using Euclidean distance, the length of least cost paths, and the length in time of least cost paths. San Juan Red Ware was produced in southeastern Utah between approximately AD 750 and 1100 and was widely traded.

Bischoff, Robert [181] see Lambert, Spencer

Bishop, Katelyn (University of California, Los Angeles), Samantha Fladd (University of Cincinnati) and Adam Watson (American Museum of Natural History)**[192]** *Social-Ceremonial Organization, Ritual Practice, and Ritual Use of Fauna in Chaco Canyon, New Mexico*

Chaco Canyon, located in northwestern New Mexico, is widely believed to have formed the religious, economic, and political core of a large regional network that thrived during the Pueblo II period. However, debate continues to surround Chacoan ceremonial and sociopolitical organization. One approach to understanding the social-ceremonial organization of Chacoan great houses is through an understanding of the nature of ritual practice and the scales at which it was organized. Pueblo peoples, past and present, have incorporated animals into ritual practice, with a special emphasis on avian fauna. Given the well-documented ceremonial importance of animals, explorations of the use, treatment, and spatial distribution of their remains can inform researchers' understandings of past ritual behavior. This poster examines ritual practice through an analysis of articulated faunal burials and avifaunal remains at several great house sites in Chaco Canyon. Relying upon excavation records made available through the Chaco Research Archive, we investigate the nature and significance of these remains, their associated materials, and architectural settings. Through the consideration of the differential contents and contexts of structured deposits containing faunal material, we address the flexible negotiations of social relationships that existed at great house sites in Chaco Canyon across space and time.

Bishop, Ronald L. (Smithsonian Institution), Dorie Reents-Budet (Smithsonian Institution) and Kathryn Sampeck (Illinois State University)**[39]** *Cream Wares of the Southeast Maya Periphery*

Since publication on the compositional analyses of Copan ceramics by Bishop and Beaudry in 2004 several scholars have addressed the manufacture and distribution of cream wares similar to those that are found at Copan. The additional accumulation of data usually results in more insights and better source attributions, but at times the complexities of compositional analysis can mislead interpretation. This paper presents highlights of greatly extended sampling and uses a geochemical perspective to assist in the modeling of the compositional patterns. This results in a more accurate attribution of manufacturing location.

Bishop, Ronald L. [125] see Moriarty, Ellen

Bisson, Michael (McGill University)**[146]** *Paleolithic Survey on the Upper Luangwa Valley, Zambia*

The northern half of the Luangwa Valley, Zambia, a southern branch of the East African rift system, is archaeologically unexplored territory in an area that may have served as an important biogeographic corridor between eastern and southern Africa during the Plio-Pleistocene. This paper summarizes the first systematic survey in this region. Paleontological reconnaissance in 2013 incidentally revealed multiple Paleolithic sites which may range from the Acheulian through the MSA. Representative artifact samples from sites are described, their age estimated based on techno-typological criteria, and the potential of the area for future excavation and/or landscape archaeology is assessed.

Bisulca, Christina (Detroit Institute of Arts), Brunella Santarelli (Metropolitan Museum of Art) and Nancy Odegaard (Arizona State Museum)**[105]** *Characterization of Minerals on Hohokam Palettes*

Hohokam palettes are a unique artifact found at several important sites in southern Arizona. The Arizona State Museum (Tucson) has an extensive collection of Hohokam palettes from Gila Bend dating from the Santa Cruz and Sacaton periods (AD 850–1150). Most of these palettes have white lead-containing minerals on the surface. This project aimed at characterizing the composition and isotope signatures of these minerals using noninvasive and minimally destructive methods, including multi-collector ICP-MS, XRF, Raman spectroscopy, and VP-SEM/EDS. The lead-containing accretions were characterized as a mixture of ground galena ore with white clay and/or calcite, and several explanations for this will be discussed. Isotopic analysis of the lead on the palettes indicates that the same lead source was exploited throughout the region; lead from this same source was also found at Valshni Village, a Hohokam site in southern Arizona, indicating movement of lead throughout the region. There have been many proposed uses for palettes in Hohokam culture. This mineral identification supports Haury's early theory that these palettes were used for pigments.

Bisulca, Christina [104] see Pool, Marilen

Biton, Rebecca [389] see Sharon, Gonen

Bitowf, Ashley [273] see Rodrigues, Teresa

Biwer, Matthew (University of California, Santa Barbara)

[230] *Preliminary Results of Paleoethnobotanical Analysis at Quilcapampa, a Middle Horizon site in Arequipa, Peru*

In this poster I present preliminary results and interpretations of paleoethnobotanical investigations at the site of Quilcapampa, located in the Sigwas Valley, Department of Arequipa in south-central Peru. Recent AMS radiocarbon dates indicate Quilcapampa was occupied for a short period during the mid-eighth century AD, which places the site within the Middle Horizon (AD 600–1000). Based on site architecture and ceramic evidence, the site may represent a colonial installation of Wari Empire (AD 600–1000) in the region, though further analysis is needed to characterize the relationship between residents of Quilcapampa and the Wari Empire. As relatively little is known about Middle Horizon foodways in the Sigwas Valley, this poster provides preliminary macrobotanical (desiccated/carbonized plant remains) and microbotanical (starch grains and/or phytoliths) data excavated during the 2015 summer field season. While these results are preliminary, they represent a first step in characterizing knowledge of Middle Horizon foodways for the region and may add to our understanding of Wari foodways and colonialism.

Blaber, Thomas, Nicholas Triozzi (American Museum of Natural History) and Anna Semon (American Museum of Natural History)

[365] *Mica Symbolism from a Late Irene Mortuary Site*

Recent excavations at the Fallen Tree Mortuary Complex (9Li8) on St. Catherines Island, GA have recovered over 20 shaped mica artifacts and dozens of fragments associated within three Late Mississippian adult male burials. This nonlocal material was purposely shaped and interred with the individuals. In this poster, I will discuss what the symbolism of the mica and examine the location and orientation of the mica discs on the individuals. In addition, I will compare the mica to several other artifact types that may have overlapping symbolism within the site.

Blaber, Thomas [365] see Triozzi, Nicholas

Black, Stephen L. (Texas State University, San Marcos) and Charles W. Koenig (Texas State University)

[21] *Investigating Hunter-Gatherer Earth Oven Intensification: a view from the Lower Pecos Canyonlands*

Foraging societies in the semiarid Lower Pecos Canyonlands of southwestern Texas intensified the use of desert succulents over a span of 9,000 years or more for food, fiber, and other uses. Food plants including Agave lechuguilla, sotol, and prickly pear were baked in earth ovens with stone heating elements, an iterative process that left massive residual by-product in the form of fire-cracked rocks and burned and unburned plant refuse in and around baking facilities. The archaeological signatures of earth oven cookery are pervasive and found in almost all settings in the region including open sites in the uplands and river terraces and protected rockshelters in the canyon walls. We have developed a systematic strategy focusing on stratigraphic excavation, 3D modeling, rock quantification, geoarchaeology, radiocarbon dating, and macrobotanical identification to document earth oven cookery at two dry and two wet rockshelters in Eagle Nest Canyon, a short box canyon off the Rio Grande. The resulting data offer an unparalleled look at this characteristic form of landscape intensification. This presentation highlights the archaeological context, our methodological approach and results to date.

Black, Stephen L. [126] see Lawrence, Ken

Blackmore, Chelsea (University of California, Santa Cruz)

[318] *Activist Archaeology and Queer Feminist Critiques in Mesoamerican Archaeology*

One of the strengths of prehistoric archaeology is its ability to document the full range of human variation. For Latin America, activist archaeology has the potential to inform postcolonial and Third World feminist critiques that challenge white supremacist legal systems that marginalize women of color and indigenous peoples. The false universalisms and cultural essentialisms found in human rights debates ignore the diverse experiences of women's oppression, especially the indigenous, poor, rural, disabled, and queer. Hegemonic models of the Mesoamerican past naturalize the oppression of women by employing colonial narratives regarding sex, gender and sexuality. The advocacy and activism of present day feminist archaeologists focus on decolonizing the discipline by documenting the fluid and contextual nature of precolumbian sex/gender systems, and demonstrating the agency and power of indigenous women in politics, religion and reproduction. In this paper, we ask the following questions: how do modern assumptions around sex, gender and sexuality find their ways into archaeological discussions of ancient Mesoamerican states? How do these narratives then become naturalized into discourses that perpetuate homophobic, sexist and racist legal systems? How can activist archaeology in Latin America both transform the discipline and potentially inform modern political debates?

[19] *Discussant*

Blackwell, Bonnie A. B. [181] see Dakovic, Gligor

Black Wolf, Michael (Tribal Historic Preservation Officer)

[295] *Discussant*

Blackwood, Alex [40] see Mackay, Alex

Blair, Susan [17] see Holyoke, Kenneth

Blair, Elliot (University of Alabama)

[379] *Linking Beads, Linking People: A Social Network Approach to Exploring Identity in the Colonial Southeast*

Beads and other ornaments were important objects involved in early colonial entanglements between Europeans and Native Americans, with the color, texture, and physical properties of these objects fostering the embodiment of new social roles within changing colonial worlds. In this paper I discuss how such objects were involved in the material manifestation of social identities as pluralistic native communities aggregated in the Spanish missions of La Florida. Looking specifically at the aggregated population of Mission Santa Catalina de Guale, a seventeenth-century mission located on St. Catherines Island, Georgia, I use the methods of social network analysis (SNA) to explore how mission neophytes utilized European glass trade beads to both foster the persistence of social identities and to create new communities in the context of population aggregation. Presenting a bipartite network

reconstruction of the Santa Catalina community, I discuss how both individuals and objects of adornment acted together to materialize changing colonial identities.

Blakeslee, Donald (Wichita State University)

[345] *Etzanoa: A Northern Caddoan Town*

Documents associated with the Juan de Oñate expedition of 1601 allow identification of the proto-Wichita (Quiviran) town that he visited. Described by natives as taking two or three days to walk through, the Spanish saw only parts of it. Still, they counted 1,700 to 2,000 houses in the southern end of the community, which was described as about two leagues (five miles) long. Above that point, the Spanish traveled away from the river for another three leagues, and when scouts returned to the river, they reported that the town "continued on" upstream. Today, the archaeological record of the town consists of over 25 separate recorded sites strung along about 14 river miles, with unsurveyed ground between them. The town consisted of clusters of houses 30 to 40 houses each, separated at distances of 300 to 400 paces by agricultural fields. Survey between recorded sites has begun, and eventually it may document this as the largest prehistoric site in the United States.

Blanchard, Morgan R. [257] see Baxter-McIntosh, Jill

Blanco, José [134] see Vidal Montero, Estefania P.

Blanton, Richard (Purdue University)

[324] *Collective Action in State Building, Past and Present*

I report on a comparative study of degrees of collective action in 30 premodern states and 30 contemporary nation-states. Contrary to the notion of democratic reform in state-building, I found roughly similar proportions of more and less collective (autocratic) states in the two samples. I propose a hypothesis for the failure of democratic reform drawn from collective action theory.

[215] *Discussant*

Blanton, Richard [215] see Costa, Angelica

Blasco, Ruth [389] see Rosell, Jordi

Blegen, Nick [389] see Tryon, Christian

Blennerhassett, Thomas (University of Toronto)

[233] *Faces of the Feast: The Spatial Organization of Face-Neck Jars in the Jequetepeque Valley, Peru*

Chicha was consumed in large quantities during social gatherings and feasting events at a number of ceremonial locales including hinterland sites, in the Jequetepeque River Valley, Peru, during the Late Moche. Face-neck jars were used in the brewing and serving of corn beer and depict supernaturals and elite lords with elaborate headdresses and ear spoils. This research showed the degree to which face-neck jars were standardized in manufacture and design and how this may have contributed to the materialization of a regional Moche identity that possibly transcended sectarian social and political differences. The faces were impressed on the necks of the vessels with the use of one-piece molds and formed part of a shared manufacturing technique in a river valley that was characterized by political and religious decentralization. At San Ildefonso the use of these standardized Moche wares depicting male elites and supernaturals appears to have anchored the feasting rites of separate but possibly confederated communities. This made chicha production central to the political and ritual economies of ancient Andean polities, and the face-neck jars likely symbolized the generosity of local lords who sponsored feasts and religious events.

Bliege Bird, Rebecca (Pennsylvania State University)

[286] *Discussant*

Bliege Bird, Rebecca [302] see Price, Michael

Blitz, John [142] see Porth, Erik

Bloch, Lindsay (UNC-Chapel Hill), Douglas Armstrong (Syracuse University) and Jillian Galle (DAACS)

[370] *Unraveling Global and Local Ceramic Production Networks: An LA-ICP-MS Analysis of Ceramics from Barbados, Jamaica, and Great Britain*

A wide variety of ceramics are recovered in plantation contexts on Barbados and Jamaica, from hand-built coarse earthenwares to refined tablewares, as well as industrial wares for sugar production. The origins for these ceramics are often uncertain. In addition to the importation of ceramics from Great Britain and elsewhere in the Americas, many potters and workshops existed on the islands to produce both quintessentially Caribbean pots as well as European-style vessels. To better understand this complex history and ceramic distribution, we present the results of elemental analysis of 250 coarse earthenwares from plantations on Barbados and Jamaica, analyzed via LA-ICP-MS. These results demonstrate how ceramic sources for both locally made wares and imported wares changed over time within Trent's Plantation on Barbados, and across multiple plantations on Jamaica. Through this analysis, it becomes possible to visualize the overlapping production networks, from global to exceedingly local, that generated these diverse ceramic assemblages.

[370] *Chair*

Blodgett, Clayton [237] see Krug, Andrew

Blois, Jessica [227] see Pilaar Birch, Suzanne

Blomster, Jeffrey (George Washington University)**[391]** *Inscription, Replication, and Production of Olmec Imagery and Regional Identities*

The Early Formative period exhibits dramatic transformations in imagery and identity throughout Mesoamerica. Focusing on a time period before techniques for mold made and mass produced objects had been achieved, this paper explores replications that involved copies, iterations, and emulations of designs and imagery. At select sites in Mesoamerica, objects have been documented with Olmec-style imagery, some of which have been linked to the Gulf Coast Olmec society; in most cases, the Olmec imagery forms a minor component within a larger panorama of regional design systems. Excavation data from Etlatongo, in the Mixteca Alta of Oaxaca, Mexico, contribute to understanding the cultural impact of the replication of imagery by looking at four classes of ceramic data: vessels, figurines, masks, and cylinder seals. Focusing on contrasts between imported originals and locally made replicas revealed through chemical compositional data, this paper explores the various techniques deployed to craft imagery and the media through which different designs were inscribed on objects and bodies, exploring the salient impacts on social identities. While some objects could have been employed for the mass replication of imagery, in other cases, imagery and identity were constructed and negotiated through more variable and contested means and techniques.

Blomster, Jeffrey [293] see Salazar Chavez, Victor Emmanuel

Blong, John (Texas A&M University)**[371]** *Prehistoric Landscape Use in the Upper Susitna Basin*

This paper presents the geomorphological and paleovegetation record of the upper Susitna River basin in the central Alaska Range, and discusses late Pleistocene and Holocene landscape and vegetation change and how this affected human use of this upland landscape. Geomorphological data suggest that the last significant glacial ice sheet covering the upper Susitna basin receded by 14,000–13,000 cal BP. Following deglaciation, there is evidence for high-energy aeolian activity spanning the late Pleistocene and early Holocene. There are at least three Holocene tephra falls recognized in the upper Susitna basin. Initial human occupation occurred by 11,000–10,500 cal BP, at least 2,000 years after the end of full glacial conditions, and 1,000 years after first evidence of landscape recovery. Initial early Holocene use appears to have been ephemeral, but human activity in the study area intensified in the middle and late Holocene as modern vegetation patterns were established. There are preliminary indications that vegetation may have been affected by Holocene tephra fall. There is evidence for a hiatus in human occupation of the upper Susitna region during the middle Holocene, but it is unclear whether this was directly related to tephra deposition, or broader climate instability during the Neoglacial Period.

Blong, Russel [77] see Riede, Felix

Blue, Kathleen (Department of Anthropology, Minnesota State University, Mankato)**[120]** *Migration and Interaction in the Epiclassic of the Tula Region: Preliminary Data as Evidenced by Dental Nonmetric Analysis*

Dental nonmetric data provide a means for the analysis of genetic affinities and relationships of individuals, and can therefore be used to reconstruct past migration and interaction patterns, both within and between sites. The dental traits of 16 individuals, along with 21 individual teeth, from Cerro Magoni, an Epiclassic site in the Tula region, were collected in this preliminary analysis. Additionally, 13 individuals from two Xajay sites, El Zeteh and Huesamenta, were also assessed. The collected traits are previously defined dental nonmetric traits of the deciduous ($n = 8$) and permanent ($n = 29$) teeth. Teeth are ideal for this type of assessment as they are more likely to be preserved and are under tighter genetic control than the cranium or postcranium, and are less prone to environmentally induced variation. Multivariate analysis of principal components (PCA), following Irish and Guatelli-Steinberg (2003), provides the clearest picture of genetic relatedness, or lack thereof, among the individuals/sites in this study. In addition to the nonmetric analysis, data on the dental health of the individuals will also be presented. Very little evidence of stress-related dental enamel hypoplasia was present, but several individuals suffered from significant periodontal abscesses. Evidence suggesting extra-masticatory activities involving the teeth was also common.

Boaretto, Elisabetta (D-REAMS Radiocarbon Weizmann Institute of Science), Bridget Alex (Department of Human Evolutionary Biology, Harvard), Valentina Caracuta (D-REAMS Radiocarbon Laboratory, Weizmann Institute), Eugenia Mintz (D-REAMS Radiocarbon Laboratory, Weizmann Institute) and Lior Regev (D-REAMS Radiocarbon Laboratory, Weizmann Institute)**[338]** *The Early Upper Paleolithic Radiocarbon Chronology and Its Synchronization in the Levant*

The timing of Early Upper Paleolithic (EUP) traditions in the Levant bears significance for understanding modern human dispersals. Despite intensive research, the Levantine EUP chronology has not been resolved because most chronometric dates come from old excavations and outdated analytical methods. Here we report dates from Manot Cave, Israel, which constitute the largest series of EUP radiocarbon dates ($n = 55$) from current excavations and state-of-the-art analytical methods. A new strategy in the field and in the lab was applied in order to cover context variability and possible contamination. The new dates set some constraints on models of migrations and technological diffusion between the Levant and Europe.

Boaretto, Elisabetta [338] see Caracuta, Valentina

Bobolinski, Kathryn (University of Montana)**[50]** *A Zooarchaeological Analysis of Housepit 54 at the Bridge River Site (EeR11), Middle Fraser BC*

Housepit 54 at the Bridge River pithouse village in south-central British Columbia provides a glimpse into the complex cultural practices that occurred at this area in the past. This village, which includes approximately 80 semi-subterranean structures, was occupied during four periods, approximately 1800–1600 cal. BP (BR 1), 1600–1300 cal. BP (BR 2), 1300–1000 cal. BP (BR 3), and 610–45 cal. BP (BR 4), firmly placing the site within both a historic and a precolonial context. It is situated in the Middle Fraser Canyon region of the Canadian Plateau, which encompasses the Fraser and Bridge Rivers as well as the adjacent talus slopes, terraces, mountains and high valleys. The Mid-Fraser offers a plethora of fauna that could have been exploited spanning fish to large ungulates. This study incorporates data from the 2013–2016 excavations at Housepit 54 to examine the zoological remains in order to test alternate hypotheses regarding relationships between animal predation, processing strategies, household population and social dynamics.

Bobolinski, Kathryn [50] see Tifental, Emilia

Bocherens, Hervé (University of Tuebingen), Dorothee Drucker (University of Tuebingen, Germany), Martina Láznicková-Galetová (University of West Bohemia, Czech Republic), Mietje Germonpré (Royal Belgian Institute of Natural Sciences, Bruss) and Christoph Wissing (University of Tuebingen, Germany)

[284] *Isotopic Tracking of Trophic Relationships (Predation, Competition, Commensalism) between Paleolithic Humans and Predators*
 Predators are usually considered not so informative in zooarchaeological investigations, except when their bones carry cutmarks. They are more viewed as a disturbing factor for the bone assemblage. However, tracking their paleoecology using stable isotopes in their bones can yield valuable information on several key aspects of their relationships with paleolithic human populations. Especially carbon and nitrogen stable isotopic composition in bone collagen of predators compared to those of humans and the available prey species can be used to quantify proportions of consumed prey through Bayesian mixing models. This novel approach allows an evaluation of competition or niche partitioning between large predators such as wolves, cave lions and cave hyenas, and Neanderthal or modern humans between around 50,000 and 8,000 years ago. Moreover, the possibility to determine which predator had access to which prey can tell us about availability of large mammal carcasses, in the case of mesopredators unable to hunt large prey themselves, and possibly document cases of commensalism between small predators (e.g., fox, wolverine) and human settlements. Finally, stable isotopic investigations can provide a crucial contribution to the debate about domestication of wolf during pre-LGM Paleolithic in central Europe.

Bocherens, Hervé [127] see Germonpré, Mietje

Bocinsky, Kyle (Crow Canyon Archaeological Center)

[227] *"Constraint and Freedom" in the Era of Big Data*

Twenty-seven years ago, Bruce Trigger presented a "new synthesis of archaeological explanation," seeking to harmonize neo-evolutionary explanations dominant in the 1970s with sociohistorical perspectives of the 1980s. Central to his thesis was the distinction between "external" constraints that structure human agency independent of humans themselves, and "internal" constraints that are historically and culturally constructed. Here, I critique Trigger's formula by acknowledging that even external constraints have histories, and I propose a useful classification of structural constraints as "static," "dynamic," and "complex." The Era of Big Data in archaeology has enabled us to identify and test the importance of structural constraints on human behavior at unprecedented spatial and temporal scales and across traditional cultural boundaries. As an example, I present new data that define complex structural constraints on maize agriculture in the southwestern United States and northwestern Mexico—the evolution of traditional maize landraces—and I attempt to use these data to track the relationships between contemporary and ancestral Pueblo people via their corn. These data are presented as part of SKOPE—Synthesizing Knowledge of Past Environments—an initiative to deliver "big" paleoenvironmental data to researchers and the public.

[112] *Discussant*

Bocinsky, Kyle [27] see d'Alpoim Guedes, Jade

Bocinsky, Kyle [142] see Lipe, William

Boczkiewicz, Roberta (MOCHE Inc.) and Jean Hudson (University of Wisconsin-Milwaukee)

[232] *Otolith Metrics and Fishing Strategies on the North Coast of Peru*

In this paper I compare Otolith metrics from two coastal sites in the Moche Valley, Gramalote and Cerro La Virgen. This comparison is aimed at evaluating possible shifts in fishing strategies as reflected in the range and normative values of fish size over time. Gramalote is a small politically autonomous fishing village occupied during the Initial Period. Cerro La Virgen is a large town occupied as part of the expanding political empire of the Chimú during the Late Intermediate Period. The two sites, located 6 km apart in space and 2,500 years apart in time, had access to the same marine habitats. I will review and illustrate both ecological and political interpretations of chronological variation in fish size at the two ends of the Andean chronological sequence.

Boczkiewicz, Roberta [232] see Hudson, Jean

Boeda, Eric (Professeur), Christine Hatté (L.S.C.E. UMR CEA-CNRS-UVSQ 8212), Michel Fontugne (L.S.C.E. UMR CEA-CNRS-UVSQ 8212) and Christelle Lahaye (UMR 5060 CNRS-IRAMAT-CRP2A)

[226] *Attempt of Modelization of the First Settlements in America at Pleistocene Based on the New Archaeological Sequences in Piauí (Brazil)*

The research our teams are conducting in the park of Capivara in Brazil since 2008 lead to reveal 6 new Pleistocene archaeological sequences. The sites are all located within a 20 km area and stem from different sedimentary and topographic environments including open air, rockshelter, cave at the bottom of cuesta, or in karst. Each of the sites shows different sedimentary sequences, including different archaeological horizons and different typotechnical compositions. The dating that we have obtained by crossing C14, TL, and OSL data lead us to identify accurately each of these archaeological sites, hence permitting to attempt a comparative approach with the major climate changes observed during the isotopic states 2 and 3. Based on this study, at a large-scale reading, there is no evidence of a correlation between major climate changes and periods of occupation. Nevertheless, we can notice a concordance of vacancy within the group of investigated sites. Technically, those vacancy periods correspond to clear technical changes. All those observations reflect the fact that our region of research witnessed different Pleistocene occupations beginning from isotopic states 2 and 3.

Boeka-Cannon, Molly [181] see Owens, Andrew

Bogemans, Frieda, Rindert Janssens and Cecile Baeteman

[356] *Unearthing Holocene Lowland Landscapes as Tool to Detect Archaeological Sites: A Case Study from Lower Khuzestan (SW Iran)*

Over the past century archaeological research in Upper Khuzestan has shown a long history of settlements in the alluvial plains. The Lower Khuzestan plain has barely been studied with research has been restricted to superficial surface surveys. The nearby presence of the Persian Gulf and the downstream parts of the rivers Karun and Jarrahi, the first one being the largest river in Iran, offer great potential for human settlements and activities. In lowlands, however, processes of sedimentation inevitably bury former landscapes, and therefore make geological investigations crucial for understanding the location of archaeological sites. Knowledge of the processes provides insights into the environmental nature, the impact of geomorphological events, and the chronological framework. The southwestern part of the Khuzestan plain, northeast of Khorramshahr will be presented as case study. The study shows the effects of both terrestrial and littoral processes on the nature of the sedimentary environments, the influence of the Holocene transgression on the sedimentary environments and, the effect of external forces on the dynamics of the sedimentary systems and landscapes.

[356] *Chair*

Boileau, Arianne (University of Florida)**[85]** *Testing the Robustness of NISP and MNE: Results of a Blind Test*

Archaeozoologists generally consider that counts are replicable data accurately representing the initial abundances of elements, individuals or taxa. However, few studies have examined these assumptions with control data. To test the robustness of NISP (Number of Identified SPecimens) and MNE (Minimum Number of Element) counts, we conducted a blind test that involved the analysis of two large experimental samples composed of known red deer (*Cervus elaphus*) and cattle (*Bos taurus*) elements. The two samples differ in fragmentation levels, ranging from simple marrow extraction to extensive comminution for bone grease rendering. Our results suggest that NISP and MNE are accurate and replicable measures of abundance for whole assemblages and for samples limited to non-long bones, even at the ratio scale. However, when analyses were restricted to long bones or long bone portions, both quantification methods poorly predicted abundances, including the ordinal level. Moreover, the blind test indicates that MNE is more robust at predicting skeletal abundances than NISP. The poorer performance of NISP in the blind test probably results from substantial variations in rates of long bone fragmentation and identification.

[85] *Chair*

Boileau, Arianne [85] see Morin, Eugène

Boisvert, Richard (NH Div. of Historical Resources)**[16]** *Settlement Organization of Paleoindian Caribou Hunters: Inferences from the Israel River Complex, Jefferson, New Hampshire*

A long-term research project in northern New Hampshire has identified nearly 20 Paleoindian components within a 1 km by 0.5 km space overlooking the Israel River. Consideration of the spatial distribution of tools and debris within the components and the distribution of these components on the landscape suggest a rigorous organization of migrating bands of Paleoindians who focused on caribou hunting. Site specific topography appears to be an essential element in the selection and use of various components in the cluster of sites

Boivin, Nicole (Max Planck Institute for the Science of Human History), Mary Prendergast (St. Louis University Madrid), Jillian Swift (Max Planck Institute for the Science of Human History), Ceri Shipton (University of Oxford) and Alison Crowther (University of Queensland and Max Planck Institute)**[32]** *Island Colonization and Ecological Transformation in Prehistoric Eastern Africa*

Until recently, the small islands lying off the coasts of Tanzania and Kenya have seen little systematic archaeological investigation. Their biogeographic diversity, reflecting various processes and chronologies of formation, nonetheless offers an ideal opportunity to examine processes of prehistoric colonization and anthropogenic impact. We explore the earliest evidence for human activity on three different islands, Pemba, Zanzibar and Mafia, and provide the first evidence for early human alterations of these island ecosystems. While the datasets remain preliminary, we are able to show that the types of anthropogenic impacts also seen on other regional island systems, including extinction, extirpation and habitat alteration, were also a feature of early settlement in island east Africa.

Boivin, Nicole [284] see Janzen, Anneke

Bokhimi, Xim [145] see Jaimes Vences, Gustavo

Bolaño-Martínez, Nataly, Oscar Uriel Mendoza-Vargas (Posgrado en Ciencias Biológicas, UNAM) and Erika Lucero Robles Cortés (Proyecto Templo Mayor, Séptima Temporada)**[225]** *Analysis of Easmobranchs from Offerings 126, 141 and 165 Found at the Great Temple of Tenochtitlan*

Numerous fish from diverse species have been found inside the Great Temple offerings. These were transported from the coast to Tenochtitlan. During the seventh field season of the Templo Mayor Project, five sawfish rostra were found inside three offerings. By analyzing macro and microscopic structures, and through the comparison with modern specimens from the Ichthyology Collection of the Institute of Marine Sciences and Limnology, at the National Autonomous University of Mexico, these animals were identified as *Pristis pectinata* y *Pristis pristis*. Nowadays, these fish are distributed in the Gulf of Mexico, the Caribbean coast and the Mexican Pacific Ocean. Individuals selected by the Mexica priest were adults, measuring almost 4 m long. Contemporary specimens are no longer of this size, since the species is in critical danger of extinction, worldwide. Through a biological and an archaeological analysis, this paper contributes to getting a better understanding of elasmobranch biodiversity during prehispanic times, as well as their use, symbolism and importance.

Bolnick, Deborah [344] see Hard, Robert

Bond, Julie [224] see Maher, Ruth

Bondura, Valerie (Columbia University)**[265]** *Frontiers in Center Places*

Borders often imply two-dimensional lines on a map, a naturalized "over here" and "over there." This is reified in places where political boundaries appear to follow ecological ones. But the nature of these lines, even apparently clear environmental ones, is always arbitrary, and the recognition of these lines is always dependent on subject position. The word "frontier" highlights this politics of definition and recognition; frontiers are defined in history and anthropology as the edges of colonial projects, and thus frontiers are recognized and experienced differentially. Drawing on several seasons of fieldwork in northern New Mexico, I discuss the ontological problem at the heart of studying ecological and political frontiers in archaeology. I seek to understand how ecological and cultural difference across space was conceptualized and experienced by examining a location that was a frontier for some (Spanish, American) and a center place for others (Pueblo, Jicarilla Apache, vecino). I look to historic ceramics and other materials to understand how the Sangre de Cristo Mountains along the Rio Grande Gorge corridor were simultaneously a border and a center, and suggest that these archaeological remains speak to the inherent tension in the overlap of marginal/central places.

Bone, Christopher (University of Oregon) and Ha Beom Kim (Department of Anthropology, University of Oregon)**[24]** *A Landscape-Scale Spatial Analysis of Neolithic Settlement Patterns in Jeju Island, Korea*

Intensive archaeological research in Jeju Island, Korea, conducted over last three decades have produced a rich set of spatial data on archaeological sites and feature distributions across the island. While these spatial data have high potential for improving archaeological understanding of past human activities, a systematic analysis of spatial data from Jeju has yet to be fully undertaken by archaeologists. In this study, we employ spatial analysis on high-resolution topographic data to enhance our understanding of landscape-driven subsistence strategies and settlement patterns. While we limit our scope to Neolithic data for this study, we anticipate that spatial analysis will contribute to a long-term understanding of human-environmental interactions on the island.

Bongiovanni, Rosie [267] see Watkins, Tia B.

Bonham, Katie McHugh, Christyann M. Darwent (University of California, Davis) and John Darwent (University of California, Davis)
[257] *A Thousand Years of Bone-Tool Production at Shaktoolik, Alaska*

Osseous tools and debitage collected from three middens at the Shaktoolik Airport site during excavations in the summers of 2014 and 2015 were analyzed using the chaîne opératoire rather than a typological approach to assess site use over time. Relative frequencies of raw materials, tool types, and production debris were analyzed from different periods. The Early Thule/Proto-Yup'ik portion (ca. AD 1200) of the assemblage came from a midden associated with a men's house (qasgiq), and is characterized by high relative frequencies of specialized tools production debris. Samples from later midden deposits had considerably less manufacturing debris than the men's house. Midden samples from Late Thule/Proto-Yup'ik (ca. AD 1400–1600) are lacking in sea-mammal bone as a raw material but have a high relative frequency of caribou bone and antler. However, Late Prehistoric Yup'ik samples (ca. 1700–1800) have high frequencies of sea-mammal bone for tool production. This difference was initially hypothesized to be the result of climatic changes, but more likely is due to differences in the season of occupation. The Historic Iñupiaq midden sample has a lack of hunting/fishing tools but presence of more exotic materials and nonutilitarian objects, which is likely associated with Russian-American contact.

Bonneau, Adeline (Université Laval/CELAT), Réginald Auger (Université Laval), Bernard Gratuze (IRAMAT, Centre Ernest-Babelon) and Jean-François Moreau (Université du Québec à Chicoutimi)

[178] *Trading around the Saguenay River (Sixteenth and Seventeenth Centuries): New Insights from Trade Glass Beads Typology and Chemical Analysis*

Hundreds of pounds of glass beads were imported among other goods by European traders to exchange with First Nations communities and to acquire fur, during the sixteenth, seventeenth, and eighteenth centuries. Once traded, these beads were used as bracelets, necklaces, cloths ornament, etc., or bartered with other Native groups. Nowadays, thousands of these beads are found on archaeological sites in Canada and can be a privileged tool to investigate trade networks in North America. As a starting point, the Saguenay River area (from Tadoussac to St John Lake) has been chosen. Beads from trading posts (Chicoutimi, Metabetchouan, Ashuapmushuan) and from Amerindian settlements (Ashuapmushuan River, Anse-à-La-Croix, Ste-Maguerite River) were classified according to available typology and analyzed with microscopy, Raman spectroscopy, LA-ICP-MS, and LIBS (Laser Induced Breakdown Spectroscopy) to reconstruct trading networks from Europe to Quebec, and around the Saguenay River. Preliminary results indicate a diverse provenance of imported glass beads (France, Germany, Italy) and obvious relationships between trading posts and local Native sites. How were the beads chosen by the Europeans? To meet Native people "fashion" tastes? Were there different qualities of glass? This study can only provide preliminary answers but emphasizes the diversity and complexity of trading in New France.

Bonneau, Adeline [178] see Auger, Réginald

Bonorden, Brooke [280] see Kilgore, Gertrude

Bonsall, Clive (University of Edinburgh) and Adina Boroneanț (Senior Researcher, Romanian Academy Institute of A)

[68] *Filling the Gap: Caves, Radiocarbon Sequences, and the Meso-Neolithic Transition in SE Europe*

Radiocarbon sequences from some cave sites in the Balkan and Italian peninsulas show a temporal gap between Mesolithic and Neolithic occupations. Some authors have seen this as a regional phenomenon and have sought to explain it in terms of a general population decline in the late Mesolithic, which facilitated the replacement of indigenous foragers by immigrant farmers. In this paper, we reexamine the evidence and consider alternative explanations for the Meso-Neolithic "gap," focusing on taphonomic, economic, social, and ideological factors.

Booher, Ashley (Texas Tech University) and Brett A. Houk (Texas Tech University)

[11] *Peri-abandonment Deposits at Chan Chich, Belize*

This poster details peri-abandonment features from the Maya site of Chan Chich in northwestern Belize. The term peri-abandonment relates to deposits or features dated to around the time of abandonment of the site. Previous research in the southern and eastern lowlands has documented widespread above-floor terminal artifact deposits in primarily epicentral contexts thought to have formed at or near the time of abandonment at many sites in the region. Excavations at Normans Temple complex at Chan Chich in the late 1990s encountered above-floor terminal deposits at the base of Structure C-1 and on the steps of Structure C-2. Excavations conducted in 2016 uncovered two additional features—an above-floor artifact deposit and graffiti on a wall in a collapsed room—at the Normans Temple complex. Both features are thought to have been created near the time of the abandonment of the site.

Boomert, Arie

[384] *Origin of the Pitch Lake: An Amerindian Myth from Trinidad*

Although Trinidad is referred to in various myths of the Warao and Arawak of the Orinoco delta and the Guiana coastal zone, only one mythical tradition is known which was documented among the Amerindians formerly living on the island. Explaining the origin of the major asphalt seepage known as the Pitch Lake in southwest Trinidad, this myth appears to be closely related to part of a mythological cycle related by the Lokóno (Arawak) of Guyana and northwest Suriname which narrates the vicissitudes of Arawanili, the first Arawak shaman, believed to live on an island, kaieri, in primordial times. Besides, there exists a systematic correspondence between the Lokóno myth of Arawanili and the mythological cycle centering on the culture hero Guahayona, recorded by Pané among the 'Taíno' as early as the 1490s. Clearly, the 'Taíno' myth is derived from the Lokóno one or, more likely, from a prototype to both. They illustrate the close relationship, most likely going back to Saladoid times, between the cosmological views of the Lokóno (Arawak) of the mainland and the 'Taíno' of the Greater Antilles.

Boonlop, Korakot [276] see Newton, Jennifer

Booth, Donald**[283]** *The Mitchell Site: An Upgrade*

In the spring of 2015, SCI Engineering, Inc. was contracted to conduct archaeological investigations ahead of the expansion of the Cedar Creek Lumberyard situated in the northeast portion of the Mitchell site (11MS30) in Madison County, Illinois. These investigations resulted in the delineation of multiple wall trench structures of varying size and shape. Most of what is known of this important Mississippian mound center comes from James W. Porter's dissertation on his 1960s salvage excavations at Mitchell ahead of the construction of an interstate highway that ultimately destroyed all but two of the ten mounds at the site. This work, and a small scale investigation in the mid-1970s and minor testing in the 1990s, constitute the extent of modern archaeological investigations previously conducted at the Mitchell site. In an attempt to put the 2015 structures into a broader Mitchell context, an effort was made to bring all of these investigations into a GIS format resulting in an overall site map depicting all of the previous excavations and all of the cultural features that have been identified to date. This GIS mapping project provides opportunities to draw new insights into this major Mississippian center in the northern American Bottom.

Borck, Lewis (Leiden University/Archaeology Southwest) and Leslie Aragon (Archaeology Southwest/University of Arizona)**[74]** *Using a Sexualized Ritual Landscape to Ontographically Examine Hohokam Gender Stereotypes*

Between approximately AD 800–1450, politically oriented religious movements flourished and withered throughout the Hohokam world of the Greater Southwest. The public architecture associated with these movements is some of the only remaining evidence that archaeologists have for their occurrence. While researchers have started to investigate how these movements were politically intertwined, in this paper we lay out an argument that their physical remains can also be used to ontographically examine gender stereotypes in the pre-textual past. To do this, we link sexual characteristics embodied by the public architecture of the Hohokam Ball Court Society and the subsequent Platform Mound Society with the structure of each Society's associated social and political organization to approach an ontographic understanding of gender stereotypes during those periods. An intersectional archaeology recognizes that multiple cultural dimensions and categories reflexively impact society at all scales, including at the individual scale. We argue that gender biases can be used to more effectively analyze archaeological data and interpret the experience of individuals who created the archaeological record.

Borck, Lewis [23] see Hedquist, Saul

Boren, Courtney (University of West Florida)**[249]** *OSL Dating and Chronology in Pensacola, Florida's Contact Period*

New research on the history of the Pensacola Bay region from the late Mississippian to the Protohistoric period is clarifying previous understandings of cultural sequences. Two recently discovered sites have created opportunities to apply new dating technologies to culture historical questions. The first site is in an incredibly dynamic area of sand dune formations on a barrier island. The second site is associated with the Luna Settlement of 1559–1561 and survives partially intact despite considerable development over the centuries. A relatively new chronometric dating technique known as Optically Stimulated Luminescence (OSL) has been applied to pottery sherds from both sites to explore the sequence of Pensacola's Native inhabitants immediately before and after Spanish contact. Results from these contrasting sites are compared in order to evaluate the applicability of OSL dating in the Pensacola region. Further applications of this data include teasing out the archaeological cultures and identities of some of the native groups living here during the sixteenth century.

Borenstein, Gabrielle (Cornell University)**[221]** *Motif and Milieu: Deconstructing the (Re)production of the Kura-Araxes Culture (3500–2400 BC)*

How do material remains—and the imagery that adorns them—inform our understanding of past landscapes? How does knowledge of landscapes enrich our understanding of the objects produced within them? This paper explores the relationship between iconography and environment in the Early Bronze Age Kura-Araxes (3500–2400 BC) culture. The Kura-Araxes was arguably the most widespread archaeological horizon in the ancient Near East, extending from the Caucasus to the Levant to the Zagros Mountains. Marked by a common material assemblage, research to date has prioritized the degree of uniformity and geographical extent of the culture across the diverse topography. Using new data from the site of Gegharot in Armenia as a lens, this paper quantitatively and qualitatively investigates the relationship between motif and milieu. It examines the imagery present on ceramic vessels, plaques, and hearths as a means not only of assessing regional variability throughout the ecumene, but also of deconstructing the co-constitutive nature of people, pots, places, and politics. Moving beyond categorical and typological systems of classification, this paper considers how communities of practice are formed, in part, as a result of common experiences in a shared landscape.

Boric, Dusan (Cardiff University), Marija Edinborough (University College London), Emanuela Cristiani (University of Cambridge), Doug Price (University of Wisconsin, Madison) and Olaf Nehlich (University of British Columbia)**[290]** *Social Bioarchaeology of Forager-Farmer Transition in the Balkans*

In Europe, Greece and the Balkans were the first areas to be reached by expanding Neolithic, agricultural lifestyles. The Danube Gorges of the central Balkans represents one of the best case studies in Europe for studying bioarchaeological consequences of the change from foraging to farming thanks to abundant settlement and mortuary record found here. It also provides a good regional anchor point for the contextualization of other contemporaneous sites across the Balkans. A large number of skeletal remains, in the excess of 500 individuals from a dozen sites found along the River Danube in this region provide best insights into how the arrival of new populations along with the adoption of agricultural lifestyles affected human biology. A large suite of now available isotope data, including carbon and nitrogen, sulfur, and strontium, along with data on sex and age profiles, dental calculus, tooth wear and microstructure, paleopathology, and musculoskeletal stress markers allow for fine-tuned reconstructions of human physical plasticity in the Early Holocene. This paper reviews the current state of knowledge on the bioarchaeological consequences of the transition in the light of the Neolithic Demographic Transition model.

Boric, Dusan [235] see Edinborough, Marija

Boroneant, Adina [68] see Bonsall, Clive

Borrell, Mònica [23] see Molist, Miquel

Borrero, Luis (CONICET), Fabiana María Martín (CEHA-Instituto de la Patagonia-UMAG), Manuel J. San Román (CEHA-Instituto de la Patagonia-UMAG), Flavia Morello Repetto (CEHA-Instituto de la Patagonia-UMAG) and Dominique Todisco (Université de Rouen)

[226] *Southern Patagonia: Coastal versus Interior Human Migration*

In spite of the ca. 14,000 Cal BP or more at 41° S, the oldest human occupations in southern Chile below 52° S are not easy to explain as a result of a Pacific coastal migration. The oldest Late Pleistocene occupations recorded at Última Esperanza and Tierra del Fuego are all focused on the exploitation of terrestrial resources and have ties with sites located in the eastern steppes, such as Fell Cave, Piedra Museo or Cerro Tres Tetras. The oldest maritime oriented human occupations of the western archipelagos are only of Mid-Holocene age. However, discussion is still open, since this region is still poorly explored.

Borrero, Luis [231] see Morello Repetto, Flavia

Borrevik, Camilla [394] see Ngirmang, Sunny

Bos, Kirsten (MPI, Science of Human History), Åshild J. Vågene (Max Planck Institute for the Science of Human History), Jane E. Buikstra (Arizona State University), Anne C. Stone (Arizona State University) and Johannes Krause (Max Planck Institute for the Science of Human History)

[143] *Tuberculosis in Past Peruvian Populations*

Due to its arid climate the Atacama Desert has an exceptional preservation of ancient biomolecules. In an archaeological context, this allows for genetic analyses of both past human populations and the infectious diseases they experienced. Precontact Peruvian cultures are among the first New World populations to show skeletal indications of tuberculosis, and recent molecular analyses have revealed that three individuals were afflicted with a rare zoonotic form of the disease acquired from marine mammals. This form is no longer circulating in the human population, and it appears to have been replaced by the European variant after contact. While the ancient disease was presumably acquired through either the consumption or manipulation of tissues from affected seals or sea lions, little is known about its range in the human population and whether or not it subsequently became human-adapted. This talk will explore our recent work on the molecular evaluation of additional skeletal material from the Americas that show physical evidence of tuberculosis infections. Our analyses are conducted with the aim of exploring the different forms of tuberculosis that were circulating in the New World before contact, their relationship to the Peruvian form, and the potential evidence for human adaptation.

Bosch, Josep [23] see Molist, Miquel

Bossio, Laura [265] see Chenoweth, John

Boswell, Alicia (Bard Graduate Center and Metropolitan Museum of Art), Ellen Howe (Metropolitan Museum of Art), Joanne Pillsbury (Metropolitan Museum of Art) and Deborah Schorsch (Metropolitan Museum of Art)

[164] *Variations in Mochica Metalwork*

In the last thirty years, archaeological investigations on the north coast of Peru have produced a wealth of new information leading to nuances in our understanding of Moche sociopolitical organization (AD 200–800). These discoveries have included excavations of intact tombs of Moche male and female elites, interred with their ritual regalia and other grave goods. Metal ornaments made up an important part of this regalia, yet our understanding of Moche metallurgy technology and its relationship to sociopolitical organization remains under-explored. In this paper we will carry out a systematic comparison of the metal objects and techniques employed to create them from multiple Moche sites. With this comparison we will further document the diverse technologies used throughout the Moche world with the goal of furthering our understanding of Moche metalworking artisans, techniques, and organization. This comparison will document the degree of standardization in Moche metalworking techniques to identify the nature and scale of differences between regions, and how these may shed light on workshop practice and social relations in the Moche world.

Boudreaux, Sarah [83] see Levi, Laura

Boulanger, Clara [180] see O'Connor, Sue

Boutin, Alexis (Sonoma State University)

[31] *Scales of Analysis and Modes of Interpretation in Osteobiography: An Example from the Dilmun Bioarchaeology Project*

Bioarchaeologists have traditionally prioritized statistically significant patterns in large skeletal assemblages to document major biocultural trends in human populations. But in the last 15–20 years, the osteobiography approach has returned to favor, encouraging bioarchaeologists to focus on the specifics of the human scale, reconstruct an experiential prehistory, and restore an identity to those “genderless, faceless blobs” (Tringham 1991:97) who people so many traditional interpretations of the past. My “Bioarchaeology of Personhood” model argues that alternative modes of interpreting osteobiographical data can provide a more humanizing view of past personhoods and can communicate effectively and accessibly with a broad range of academic and public audiences. Unlike the outlier-oriented, case study approach of decades past, osteobiographies should draw from—not substitute for—the context provided by population-based approaches. To illustrate these points, I will present a fictive osteobiographical narrative about a subject from ancient Bahrain, whose remains are studied by the Dilmun Bioarchaeology Project.

Bouwman, Abigail [219] see Breidenstein, Abigail

Bovy, Kristine (University of Rhode Island)

[228] *Predicting and Assessing the Impact of Environmental Events on Seabirds at Tse-whit-zen Village*

Seabird remains, especially murrelets, scoters, loons, grebes, shearwaters and gulls, are abundant in the Tse-whit-zen faunal assemblage. There is considerable biological research on the effects of climate change on seabirds, especially in light of recent climate trends; for example, responses of seabirds to increased sea surface temperatures associated with El Niño events are well documented. In contrast, there has been relatively little research on the effects of recent earthquakes on marine birds. One might predict that nesting habitat could be altered due to coastal subsidence or tsunamis. However, effects on non-nesting birds, may be considerably more subtle, due to the obvious mobility of marine birds (compared to shellfish or other

smaller animals). One possible effect could be a decline or change in the availability of seabird prey such as shellfish or small fish, due to substrate changes or eelgrass destruction. At Tse-whit-zen, herring is one of the major components of the fish assemblage, and many of the seabirds recovered were likely hunted while feeding on herring spawn. I examine the relationship between herring and seabirds at the site through time in response to past earthquakes. Spatial differences in taxonomic composition and taphonomy will also be examined.

Bowen, Corey (Vanderbilt University) and John Janusek (Vanderbilt University)

[230] *Felines and Condors and Serpents, Oh My! Cataloging Zoomorphic Imagery in Tiwanaku Ceramics*

A regimented canon of ceramic production emerged at the site of Tiwanaku in the fifth–sixth century AD, coinciding with the transformation of the site from a local ritual center to a regional political authority. The highly standardized range of forms and painted imagery it produced presents great potential for an extensive analysis of both complete and fragmented Tiwanaku-style vessels. To date, most analyses of Tiwanaku ceramic vessels have categorically centered on form in order to facilitate quantitative comparisons of archaeological contexts. Our recent studies of ceramic vessels from mortuary contexts in the Tiwanaku heartland, under the aegis of an archaeological project directed by Deborah Blom and Kelly Knudson, have sought to develop iconographic classifications to assist our understanding of Tiwanaku's material culture. We seek to create a comprehensive catalog of the zoomorphic representations depicted on Tiwanaku vessels. This assemblage will constitute the foundation for a broader analysis of animal imagery as potent symbolic media on Tiwanaku vessels and other materials, such as stone sculptures.

Bowie, Kristina (University of Victoria) and Jillian Harris (Penelakut First Nation)

[17] *Traditional Practices That Inform Cultural Competency in Archaeological Studies and Cultural Safety for First Nation Communities*

While Canada's Truth and Reconciliation Commission on Indian Residential Schools completed its mandate in December 2015, pursuit of the truths and movements toward reconciliation of past residential school practices continue. Efforts to identify missing former students and locate unmarked cemetery, grave and burial sites are continuing at the former Kuper Island Industrial School on Penelakut Island. This work is structured as both a collaborative and community based archaeology and is being conducted at the request of the Penelakut First Nation to address contemporary concerns. Contemporary archaeological methodologies, including noninvasive ground-penetrating radar survey, are informed by oral histories of residential school survivors, and by traditional skedelich rituals conducted by First Nation community members. As a traditional methodology, skedelich rituals provide cultural safety as a valued method of healing for First Nation community members, a result which is pursued, but for which contemporary Westernized archaeological methods may be inept. In addition to providing an Indigenous framework for analysis and interpretation of this site, cultural traditions and community members must be included in this search journey. This points to cultural competency on part of the archaeologist wanting to help, required before any form of reconciliation of the past can follow.

Bowler, Victoria (University of New Mexico), Emily Lena Jones (University of New Mexico) and Cyler N. Conrad (University of New Mexico)

[127] *The Canids of Arroyo Hondo: A Reanalysis*

Domestic dogs were an important part of human cultures in the prehistoric American Southwest; the significance of these animals is apparent from ceramic decorations and clay figurines, as well as faunal remains. But how these animals functioned within Southwestern cultures is less well-understood. Prehistoric dogs' roles in some cases seem to have been similar to those of modern dogs: protector, worker, and pet. However, zooarchaeological data have shown that dogs, like turkeys, were also used as a food resource and might have sometimes been sacrificed or killed as offerings. The use of stable isotope analysis has the potential to clarify the relationships between humans and dogs in the prehistoric American Southwest. In this paper, we present preliminary data from our reanalysis of the canids from Arroyo Hondo Pueblo, a Pueblo IV community in the Northern Rio Grande.

Bowman, Robert C. [257] see Keeney, Joseph

Bowyer, Vandy [339] see Metcalfe, Jessica

Boyd, Carolyn (Shumla/Texas State University) and Kim Cox (Shumla)

[126] *Burning Water: Time and Creation in the Rock Art of the Lower Pecos*

The White Shaman Mural (~2000 BP) is a planned composition with rules governing the portrayal of symbolic forms and the sequencing of colors. Using digital microscopy we determined that all black paint was applied first, followed by red, then yellow, and last white. Complex images were woven together to form an intricate visual narrative detailing the birth of the sun and beginning of time. One of the key figures in this creation narrative is a small anthropomorphic figure bearing red antlers tipped with black dots. The juxtapositioning of red antlers and black dots is ubiquitous in Pecos River style rock art, as is the painting sequence of these two pictorial elements. In each example, the black dots were applied prior to the red antlers. "Burning Water" explores the significance of this motif in the White Shaman Mural and in the graphic vocabulary of the Lower Pecos. It is a visual pun or couplet metaphor joining two opposing forces—fire and water—to initiate creation and the beginning of human time.

Boyd, Carolyn [126] see Steelman, Karen

Boyd, Charles (Radford University) and Donna Boyd (Radford University)

[259] *The New Role of Archaeology in Forensic Science*

In 2015, the Physical Anthropology section of the American Academy of Forensic Sciences (AAFS) officially became the "Anthropology" section of AAFS. This reflected not simply a name change, but an acknowledgement of the importance of archaeology to forensic anthropology and forensic science. This has heralded a new age of forensic anthropology based on increasing reliance on archaeological methods and theoretical principles. The interaction between forensic archaeology, anthropology, and forensic science is best exemplified in Virginia—since 1999, the authors have worked in conjunction with the Virginia Office of the Chief Medical Examiner, as well as local, regional, and state law enforcement entities, in over 170 forensic investigations. Many of these involved archaeological search and recovery of surface and buried remains. This work has resulted in successful adjudication of many of these cases. The authors have also trained federal and state law enforcement officers in proper forensic archaeological methods. This poster provides an overview of the contribution of archaeology to these cases, as well as an examination of the role of forensic archaeology within the Virginia Medical Examiner system. The opening of AAFS to archaeologists allows the broader application of relevant archaeological methods and principles to modern problems.

Boyd, Matthew**[319]** *Prestige Foods and the Adoption of Pottery by Subarctic Foragers*

In the last two millennia before European contact, pottery technology was adopted by foragers across much of the southern Canadian Boreal Forest in response to the spread of Woodland (~100 BC—AD 1700) cultural influence. However, the function and importance of pottery in these northern societies remains unclear due to a combination of poor organic preservation, thin and disturbed stratigraphy, and limited archaeological exploration. In this study, we summarize the results of food residue analyses from 177 archaeological sites distributed across central Canada. We show that pottery was closely linked to the consumption of domesticated plants, especially maize (*Zea mays* ssp. *mays*), which in most areas of the Subarctic were probably only rarely available through trade or local cultivation. This, combined with other lines of evidence, suggests that pottery was reserved for socially-significant meals such as feasts and imbued with special ritual, culinary, and/or social meanings. We speculate that the spread of pottery technology across the region marks a subtle change in the symbolism, and perhaps importance, of intergroup reciprocity and cooperation during the Woodland period.

[319] *Chair***Boyd, Siobhan, Zev Cossin (University of Illinois, Urbana-Champaign), Samuel Connell (Foothill College) and Ana Gonzalez (Foothill College)****[220]** *A Dynamic Social Landscape: Recent Investigations at the Hacienda Guachalá, Northern Highlands of Ecuador*

The area of Cayambe in the northern highlands of Ecuador is marked by the physical remains of successive waves of Inca and Spanish imperial expansion and their enduring consequences. Across the landscape high altitude fortifications evidence the drawn-out struggles between expanding Inca and local forces during the fifteenth century. Similarly, elite haciendas that transformed the rural countryside in the interests of imperial and state power continue to dominate the social and political landscape. In this paper, we review recent work carried out by the Proyecto Arqueológico Pambamarca (PAP) in the area of the Hacienda Guachalá, where archaeological investigations have contributed new perspectives on the continuous cultural history of the region. Archival, geophysical, and material evidence have generated both new questions and a greater understanding of the ways in which communities navigated the profound changes that characterize this important region of the northern Andes.

Boyle, Tristan [37] see Webster, Chris

Boytner, Ran (Institute for Field Research)**[70]** *Market Economy Solutions to Funding*

Traditional funding structure to support archaeological research consists of grants from public or private organization or donations from individuals, public or private entities. But as these traditional sources are shrinking their allocations for basic research in general, and for the social sciences in particular, archaeologists can harness the power of the market and find market solution to funding of research. This paper will examine one such case—the institution of field schools and the significant way in which they create market incentives to all to generate significant funding, great research and strong commitment to pedagogy.

[70] *Chair***Bracken, Justin (CUNY Graduate Center)****[346]** *Polyvalent Monumentality: Analyzing Geospatially the Interplay of Fortification and Hydrology at the Maya site of Muralla de León*

Dissertation fieldwork since 2014 at Muralla de León has documented, mapped, and partially excavated an integrated system of earthworks that appears to have served both large-scale defensive and hydrological functions. Located on the shores of Lake Macanché, the site sits atop a steep-sided natural rise, artificially augmented in height by an encircling stone rampart wall, or enceinte. A defensive function for the enceinte is hypothesized, though it also appears to serve as a means of water control within and around the site. Additionally, an artificial channel just outside of the wall likely functioned both for navigation and as a defensive moat. In order to explore the proposed functions for these features, a system of detailed mapping and targeted excavation has been deployed. The mapping effort has utilized a total transit station and handheld GPS unit to produce a high-resolution DEM. This level of detail has allowed for GIS analyses of movement, using tools like least cost path, and of the hydrology of the site interior and adjacent channel. These analyses have informed the major hypotheses of the project, offering useful but not unequivocal insight. Here, the contributions of this spatial component of the project are weighed and discussed.

Bradley, John [28] see Brady, Liam

Bradtmöller, Marcel (University of Erlangen), Gerd Christian Weniger (Neanderthal Museum), Andreas Maier (University of Erlangen-Nürnberg), Isabell Schmidt (University of Cologne) and Maria José Iriarte-Chiapusso (University of the Basque Country)**[165]** *The Repeated Replacement Model Reexamined: Methodological Considerations and Dataset Improvements*

Five years ago a general explanation model was introduced regarding the observed dynamics during the Upper Paleolithic timeframe on the Iberian Peninsula. In doing so, a scenario of repeated replacements of human groups was established, reflected by fluctuations within the radiocarbon chronology and changes within the archaeological record. Incorporated into the "Adaptive Cycle Model," this model assumes a strong relationship between the constant changes of stadial-interstadial environmental conditions and the trend of human resilience to, especially external, stressors. In doing so, the recurring rapid shifts from interstadial to stadial conditions can be understood in the context of a release phases. Only on that account could the soon-succeeding second release impact, the climate deterioration during Heinrich Stadials, have affected the abandoning of the Cycle, i.e., a "breakdown of the meta-population." Accordingly, the resilience threshold was reached by an environmental "double-punch." After several years of intensive research in the fields of Upper Paleolithic research we will test the key assumptions of the model a second time, incorporating the enhanced radiocarbon chronology, new site data and improved paleoenvironmental models. In doing so, we will reexamine the theoretical considerations, as well as the implications derived from the enhanced archaeological and paleoenvironmental datasets.

Brady, Liam (Monash University)**[28]** *Embodiment and Relatedness: The Rock Art of Muluwa, Wulibirra, and Kamandarringabaya*

As an interpretive tool for rock art studies, the concept of embodiment has much to offer especially when used in conjunction with ethnographic data. In this paper we focus on embodiment in the context of relatedness using a case study involving Yanyuwa rock art from three sites—Muluwa, Wulibirra, and Kamandarringabaya—in the Sir Edward Pellew islands in northern Australia's southwest Gulf of Carpentaria region. Although not stylistically similar, the rock art from these sites is intimately connected to the travels, events, networks and bodily transformations involving the White-bellied Sea Eagle and Dugong Hunter Ancestral Beings (Dreamings) as well as other spiritual beings known as *namurlangjangku*. Using ethnographic data collected over a 30+ year period we highlight how these sites and motifs are part of a network of nonhuman entities to which human entities then become involved—the images found here embody the network of relations that Yanyuwa find themselves within. More specifically, we explore the interrelationship between

Ancestral and spiritual beings, place, embodiment, kinship, and rock art to better understand how Yanyuwa rock art is perceived and experienced, as well as the role it plays in shaping Yanyuwa identity and relationships with neighboring groups.

[28] *Chair*

Brady, James (Cal State L.A.)

[386] *An Interpretation of Motifs on Protohistoric Polychrome Pottery from Naj Tunich Cave*

A good deal of academic attention has been focused on the iconographic analysis of Maya painted ceramics, principally from the Late Classic Period and to a lesser extent from the Early Classic. The tradition, however, begins in the first century AD during the protohistoric ceramic stage. Virtually no analysis has been undertaken on these earliest Maya artistic expressions probably because the motifs are largely geometric and figural representations are rare. I compiled a motif inventory from Ixcancio Orange Polychrome sherds recovered from Naj Tunich Cave, Guatemala. Comparisons with ceramics from other sites indicate that the motifs are widely distributed indicating that the symbol set was understood throughout the southern lowlands. The message appears to be a fundamental one in that the same motifs continue to be used all the way through the Classic Period. The message is related directly to earth and water.

[386] *Chair*

Brady, James [386] see Nation, Humberto

Braekmans, Dennis (Delft University of Technology and Cranfield Forensic Institute), Brett Kaufman (University of Science and Technology Beijing), Hans Barnard (UCLA Cotsen Institute of Archaeology) and Ali Drine (Institut National du Patrimoine Tunisie)

[240] *Provenance and Distribution of Neo-Punic Ceramics at Zita, Southern Tunisia, and Beyond*

The site of Zita is an urban mound located in southern Tunisia and situated along an ancient trade route from Carthage to Tripoli. It is the highest point on a peninsula jutting into the Mediterranean Sea across from the Island of Djerba, often identified as the Island of Calypso of the Lotus-Eaters from the Odyssey. Established as a Carthaginian settlement around 500 BCE, the city became a Roman regional center in the first century CE. Zita still has industrial features such as ceramic kilns and metallurgical zones. The ceramics and presence of kiln zones provide the opportunity to characterize the full spectrum of production and/or import and the site. In this study a high resolution geochemical analysis by ICP-OES/MS (n = 145) has been carried out in order to detect the provenance of these ceramics and provide an analytical reference set of data for ceramic production in this part of North Africa. This paper emphasizes provenance of these materials as a key concept to understand the development of trade and technology through time.

Braje, Todd (San Diego State University)

[251] *Trophic Cascades, Kelp Forest Dysfunction, and the Genesis of Commercial Abalone (Haliotis spp.) Fishing in California*

For over 12,000 years, hunter-gatherers of coastal California harvested abalone as an important subsistence and raw material resource. Archaeological evidence from the Northern Channel Islands suggests that human-induced reductions of local sea otter populations may have triggered a trophic cascade beginning 8,000 years ago and released abalone and other shellfish from predation pressure, helping to sustain intensive human harvest for millennia. With the arrival of the Spanish in AD 1542 and the Mission Period in AD 1769, abalone were quickly released from nearly all predation as sea otters were locally extirpated and indigenous shellfisheries were severely disrupted. For decades, abalone populations exploded, reaching unprecedented sizes and densities. By the 1850s, however, Chinese immigrants recognized the potential of abalone and founded the first commercial shellfishery in California. Although the fishery was predicated on ecosystem dysfunction, Chinese fishers harvested black abalone relatively sustainably for decades. Ironically, it was state and federal claims of overharvest that resulted in targeted legislation of Asian fishers and the subsequent collapse of the commercial fishery by Euro-American interests. Today, California abalone communities are a shadow of their former selves, but restoration targets based on historical hyper-abundance and lacking perspectives from deep history may only compound the problem.

Braje, Todd [32] see Erlandson, Jon

Brandi, Rafael [45] see Colonese, Andre Carlo

Brandt, Bernd W. [69] see Ziesemer, Kirsten

Brandt, Johann Rasmus [151] see Wong, Megan

Brandt, Steven (University of Florida), Lucas Martindale Johnson (University of Florida) and Abebe Taffere (University of Florida)

[171] *Temporal and Spatial Variability in Pre-Aksumite Lithics from Mezber, NE Ethiopia: Social and Economic Implications*

With over 33,000 total excavated flaked stone artifacts and >18,000 analyzed from deposits in primary context, Mezber offers a unique opportunity to understand the role of lithics in Pre-Aksumite societies. Using multiple raw materials and reduction sequences, knappers produced a wide array of LSA/Neolithic tools for domestic use, and a narrower range for specialized activities. Locally available chert was the most common raw material, although pXRF results indicate ≥ 3 as yet unknown distant sources for obsidian, the second most frequent toolstone. Significant temporal and spatial variability in lithic type and frequency over ~1,400 years of continuous Pre-Aksumite occupation at Mezber, suggests important changes in community practices that incorporated lithics. Sparse during the Initial Phase, lithics become more frequent and typologically diverse in the Early Phase, reflecting their importance in domestic activities. Lithics experience a dramatic increase in frequency during the Middle Phase. Some fields are dominated overwhelmingly by only one artifact type (scrapers), suggesting more intensive craft specialization. Lithic frequencies decline markedly during the Late Phase, and especially at those locations with previous high scraper frequencies. We conclude by discussing the economic and social roles that lithics played in early state formation in the northern Horn of Africa.

Braswell, Geoffrey (UC San Diego)

[182] *Discussant*

Braswell, Geoffrey [218] see Robinson, Eugenia

Braun, David R. (George Washington University), Jonathan S. Reeves (George Washington University) and Matthew Douglass (University of Nebraska-Lincoln)**[38]** *Density, Discard, and Distraction: How Do We Form Inferences of Behavior from the Early Pleistocene Record*

The discovery and excavation of dense patches of lithic artifacts has spurred discussion about how such features form. Interpretations are often based around the assumption that these reflect locations of targeted hominin use. Despite their assumed significance, there remains the possibility that high density scatters may reflect the vagaries of the formation processes of the Early Pleistocene archaeological record. Here we use a neutral model of the formation of the archaeological record to investigate the significance of archaeological densities at local and global scales. Even when the underlying processes driving the discard of lithic material are random, there is the possibility that high artifact densities can form. Moreover, when investigated at a local scale, distributions of artifact frequencies can appear nonrandom. These results suggest that while hominin behavior was not stochastic, the overprinting of behavior due to time-averaging may cause it to appear so. As such we suggest that Early Stone Age archaeologists should investigate formational processes at multiple scales when using artifact density to develop behavioral inferences.

Braun, David R. [153] see Beaudoin, Ella

Braun, Greg [22] see Roddick, Andrew

Braun, Gregory (University of Toronto, Department of Anthropology)**[178]** *Ceramic Technologies and Technologies of Remembrance: An Iroquoian Case Study*

The patterned deposition of certain objects, often in association with materials or structures that are seen to have symbolic associations, is an act of memorialization seen in many Neolithic and broadly shamanic societies throughout the world. This paper uses petrographic and contextual data to explore how objects manufactured with certain material qualities may have served as symbolic referents to memories related to Ontario Iroquoian ritual and social practices, both at the object level, and in the built environment of the Iroquoian longhouse. Through these associations, Iroquoian encounters with "bundled" material qualities precipitated remembrance. The participatory experience of creating (and by extension, re-encountering) structured deposits containing such objects resulted in the creation, modification, or destruction of other social relationships. For its occupants, the spaces inside an Iroquoian longhouse were filled with unseen subterranean deposits, containing materials and memories that reflected and reified Iroquoian cosmologies, and influenced quotidian social practices.

Bray, Tamara (Wayne State University)**[331]** *A View from the Hinterlands: Early Colonial Objects in Mortuary Contexts in Northern Highland Ecuador*

In this paper I revisit a particularly interesting find made in the Pimampiro District of northern highland Ecuador a number of years ago. It consisted of a traditional shaft tomb burial that contained an unusual assemblage of items, which included seemingly obvious Late Period Caranqui and Panzaleo wares together with a set of four Nueva Cadiz beads. How and why did these precious European objects penetrate this seemingly remote region at such an early date to be inserted into such a basic ritual context? What does their presence within an otherwise completely "precolumbian looking" context indicate with respect to temporality, materiality, and archaeological assumptions? In this paper, I analyze this mortuary assemblage with respect to regional, historical, and social context, as well as in light of networks of meaning, the notion of value and material agency.

[65] Moderator**Breidenstein, Abigail (Department of Anthropology, University of Michigan), Geoff Emberling (Kelsey Museum of Archaeology, University of Michigan), Abigail Bouwman (Institute of Evolutionary Medicine, University of), Frank Ruehli (Institute of Evolutionary Medicine, University of) and Abigail Bigham (Department of Anthropology, University of Michigan)****[219]** *Christian Life in Medieval Nubia at el-Kurru, Sudan*

The Nubian site of el-Kurru (modern Sudan) lies along the Nile River about 140 km upstream of Old Dongola, the capital of the Medieval Christian kingdom of Makuria. In 2015–2016, a cemetery adjacent to the settlement was excavated, containing 26 skeletons. Here, I will present current bioarchaeological work on these individuals. Biological profiles were developed, including sex and age ranges, health markers evaluated, and indicators of pathology and trauma identified. Those interred span all ages, from infants to older adults, with an equal distribution of sexes. No indications of interpersonal violence are present. Age-related pathologies (i.e., osteoarthritis, advanced dental wear) are evident in a quarter of the sample population, while signs of probable disease (i.e., periostitis, cribra orbitalia) are present in another quarter. Archaeological evaluation of the burials, directional organization, and scarce grave goods indicates these individuals were Christians. Further analyses include extraction and sequencing of ancient DNA, stable isotope analysis, AMS Radiocarbon dating, and additional development of biological profiles to include stature and ancestry markers. Compared to a wealth of physical anthropological work on Medieval Lower Nubia, this sample population provides a means to understand life in the relatively less-studied kingdom of Makuria using archaeological and bioarchaeological data.

Breitenbach, Sebastian [162] see Baldini, James

Bremer, J. Michael [394] see Higgins, Howard

Brenan, Julia**[318]** *Birch Island: The Archaeology and Memory of Resettlement*

Archaeology has the ability to bring people together and assist communities in creating their own historical narrative so it can be passed on and acknowledged, corrected and recorded, within and outside of their community. My work in Happy Valley-Goose Bay, Labrador on an archaeological site that only ended occupation in the late 1960s facilitates the formalization of the historical narrative of the former Birch Island community through archaeology, historical research and personal interviews. Community members who once lived on the island will be invited to excavate with us in addition to participating in formal and informal interviews to get a better picture of what life was like when the community flourished. All the information gathered will be available for public use and historical plaques will be placed at the site to inform and commemorate the area. By actively seeking out these open lines of communication and engagement, we are decreasing our own bias and allowing for a more engaging, meaningful and accurate interpretation of places that have a living history for those connected to it.

Brendzel, Tamar [159] see Kennedy, Ryan

Brendzy, Cara [17] see Smith, Sarah

Brennan, Michael [83] see King, Eleanor

Brennan, Candice

[300] *Prehistoric Settlement Patterns of the Los Alamitos Bay, Southern California*

The details of prehistoric settlement patterns in the Alamitos Bay area of southern California are not well documented. Due to rapid urban development throughout the twentieth century, the archaeological record has been explored with only limited excavations. The lack of systematic investigations has limited our knowledge about prehistoric populations and their variability in terms of subsistence practices and settlement patterns. Using a review of information gleaned from archaeological studies conducted over the last 60 years, I generate a model of settlement pattern that summarizes our current understanding of how communities were temporally and spatially distributed across environment of Alamitos Bay as a function of the available subsistence resources and how these communities responded over time.

Breslawski, Ryan (Southern Methodist University)

[85] *Seasonal Bison Exploitation in North American Prehistory: A Probabilistic Approach Using Fetal Prey Osteometry*

Bison remains often serve as evidence for seasonal food exploitation in archaeological investigations of the Great Plains and adjacent regions. Interpreting this evidence relies on discrete rutting and calving periods that allow zooarchaeologists to link ontogenetic data to a specific time of year. However, ecological data on modern bison show that the timing of rutting and calving behavior varies between herds and even within the same herd between years. To address this problem, this study models variability in conception dates across modern bison herds. In combination with metric data from fetal prey remains, these conception models are then used to create intra-annual probability distributions for the timing of a hunting event. Using intra-annual probability distributions obtained through this approach, this paper assesses seasonal subsistence hypotheses at three Late Holocene sites: Big Goose Creek (Wyoming), Baker Cave III (Idaho), and Upper Tucker (Texas). Unlike efforts to infer seasonality from fetal bison remains with other methods, this study provides easily interpretable probabilities showing the level of agreement between data and hypotheses.

Breukel, Thomas (Leiden University)

[69] *Jade Axes from the Site of Pearls, Grenada: A Field-Based Microwear Analysis*

This paper reports upon the wear trace analysis of 20 ground stone axes from the Ceramic Age site of Pearls, Grenada. The selection contains several exotic lithic materials including twelve jadeitites, for which the nearest known source is over 1,100 km away. Pearls is a heavily disturbed site on the Atlantic coast of Grenada, of which much of the material record is held in private custody. Yet, the site holds central importance in the wider interacting region, as a lithic, ceramic, and ornament production center with suggested exchange ties to many source areas and partner sites. A biographical study was undertaken in order to obtain information about the context in which the jadeite materials arrived at the site, where and how they were manufactured, and if they had been put to use. Collections from the Windward Islands have thus far not been analyzed using microwear analysis, making this study a first. Further, the analysis was enabled by transporting a DinoLite digital microscope and a Nikon Optiphot metallographic microscope to the field. The methodological complications with a study of archaeological records accessible solely through non-institutional sources will be evaluated.

Brewer, Jeffrey [337] see Haggard, Alyssa

Brewer, Katherine (University of New Mexico)

[192] *Religion and Death: Missionization and Its Effects on Puebloan Burial Practices during Spanish Colonization*

For the Spanish, conversion to Catholicism was an important part of the colonial strategy in the New World in order to have more perceived control over the indigenous groups they encountered there. In New Mexico, conversion of the Puebloan peoples became the main reason for remaining in the territory after little to no material wealth was found. Much of this conversion was forced, and the question remains as to exactly how many Puebloans converted and how many converted in public while practicing their native religion in private. By analyzing burial patterns pre- and postcontact, it is possible to see changes in burial ritual related to the conversion process. Catholic burial ritual involves a specific set of steps, from the last rites to the interment, while the Pueblos had their own burial rituals that differed from Catholicism in many ways. Both of these can be compared to Puebloan mission burials to see what, if any, changes occurred due to missionization.

Bria, Rebecca E. (Vanderbilt University)

[37] *Rethinking Assemblages in the Digital Age*

Archaeologists have long drawn on technological advances from other disciplines to create new ways of visualizing and classifying data. Relational databases in particular have been a cornerstone of archaeological inquiry into material assemblages, whether sets of artifacts and their attributes or constellations of sites across regions. But how have new technologies (e.g., spatial, three-dimensional, mobile, and digitally collaborative platforms) enhanced archaeologists' ability to trace, and ultimately understand, complex networks of social and physical relationships between humans, things, and spaces? How can new materialist theories, with their sharp focus on the matrices or assemblages of materials that constitute any archaeological object or subject, lead us to rethink how we develop and apply digital technologies in archaeology? This paper offers insights from multiple years of digital archaeological research in the highland Andes to combine recent developments in digital and theoretical archaeology. It argues that the relational structure and ontology of many digital data applications can enhance archaeological understanding of human-material dependencies. It contends that digital archaeology, with its unique ability to trace human-material relationships across time and space, can greatly contribute to contemporary debates regarding the social and physical environment.

[37] *Chair*

Bria, Rebecca E. [222] see Sharp, Emily

Briceno, Jesus [222] see Bardolph, Dana

Brickley, Megan**[22]** *New Perspectives on Past Vitamin D Deficiency*

Less than half of the current world population is estimated to have adequate vitamin D status and potential consequences are much debated. For those engaged in addressing the challenges that vitamin D deficiency poses, information on past deficiency provides an important time dimension to current debates. Over the last 15 years I have undertaken extensive collaborative work on past deficiency. Investigations at St. Martin's, a nineteenth-century UK site, established diagnostic criteria and revealed the sociocultural complexity of deficiency. Work undertaken at McMaster has demonstrated that contrary to popular belief the condition is not just associated with Northern European cities in the Industrial Revolution. In the largest-scale project undertaken to date (3,426 individuals) vitamin D deficiency has been shown to be widespread across the Roman Empire (third–sixth c.CE). Although latitude plays a role, level of urbanization and social complexity are clearly also factors. New work on defects in dentine linked to vitamin D deficiency offers the opportunity to determine the number and severity of episodes of deficiency. Dentine defects are preserved indefinitely and in combination with skeletal features can illuminate the individual experience of deficiency in the past and contribute to current debates on health.

Brien, Marie-Claude [178] see Loewen, Brad

Briggs, Rachel (University of Alabama)**[142]** *A Gendered Approach to Assessing Differences in the Hominy Foodway in Central Alabama*

Between AD 1000–1120, groups living in the Black Warrior Valley of west-central Alabama adopted maize agriculture and began practicing an ancestral hominy foodway that not only included nixtamalizing culinary steps, but also included the use and production of a new ceramic technology, the Mississippian standard jar, as well as a new cooking technique, hot coal cooking. Curiously, while groups to the east of the valley also adopted maize and began cooking hominy, they forewent other material and practice-based signatures characteristic of the foodway in the Black Warrior Valley. While this rejection has traditionally been interpreted as a broader, active refutation of a Mississippian lifeway, this paper draws on settlement, subsistence, and ceramic data to assess whether differences in gender roles and seasonality may instead be more useful for understanding the development of these two coterminous hominy traditions.

Briggs, Garrett (Northern Arizona University)**[266]** *Analyzing Wood-Use Behavior at Wupatki Pueblo*

Wupatki Pueblo is one of the best known prehispanic settlements in northern Arizona. Unfortunately, very few excavation reports exist and only a couple of successful dendochronological analyses have been published. Through a reexamination of wooden construction elements, legacy data from previous publications, and unpublished field notes, stored at the Laboratory of Tree-ring Research, this paper presents the results of the first wood-use behavior analysis at Wupatki Pueblo. The use of a holistic methodology (i.e., the use of statistical analyses and Exploratory Data Analyses) revealed that tree type allocation and consumption, particularly the utilization of both high and low elevation conifers, maintained throughout the construction sequence at the pueblo. Through the combination of modern and post-modern indigenous theories and analogical models (predicated upon wood-use behaviors displayed among one of the primary descendent communities), wood-use behavior at Wupatki Pueblo is interpreted as an example of learned behavior through enculturation, guided by a shared cultural system of meaning based in ritual. The emphasis of this paper is not only on the results of this analysis, but also on the importance of considering both the culturally defined and scientifically explained contexts when interpreting wood-use behavior.

Bright, Lisa and Joseph Hefner (Michigan State University)**[300]** *A Different Kind of Poor: A Multi-Method Demographic Analysis of the Santa Clara Valley Medical Center Historic Cemetery*

From 2012–2014 excavations at the Santa Clara Valley Medical Center (SCVMC) Historic cemetery (circa 1875–1935) resulted in the exhumation of 1,004 individuals. The cemetery, which served as one of several county burial grounds for the indigent and unknown individuals of the area, provides a glimpse into the growth and development of Santa Clara County, California. To date no cemetery records have been located, leaving the identity of these individuals a mystery. To better understand this population, a demographic analysis employing various Siler and Gompertz mortality models, as well as correspondence and transition analysis was used to compare the osteological age-at-death assessments at SCVMC to other historic bioarchaeological samples (Milwaukee County Institution Ground, Alameda Stone, and Voegtly). Additionally SCVMC is compared to known age-at-death data from Mission City Memorial Park, a contemporaneous historic county burial ground in Santa Clara County, whose data was scraped from a local genealogy website. The results indicate that individuals interred at SCVMC were likely recent immigrants into the area, and experienced higher mortality risk than the comparative sample. Interestingly males and females at SCVMC experienced identical mortality risks, contrary to the comparative sample. Demographic analysis allowed for a better understanding of county burial practices.

[372] *Discussant***Brighton, Stephen (University of Maryland)****[207]** *Working on the Margins of the Modern World and Within Archaeology: The Historical Archaeology of Late Nineteenth- and Early Twentieth-Century Ireland*

In Ireland, historical, post-medieval, or modern world archaeology as a discipline is located on the margins. The time period and material comprising our research is argued by many to be relevant only to the pursuits of historians and folk studies. In this paper I discuss the importance and relevance of a discipline on the margins and the study of Ireland's impoverished class during the last decades of the nineteenth and early twentieth centuries. This marks one of the most dynamic periods in Ireland's political, economic, and cultural history which includes the complexities of identity during struggle and conflict. The material culture from two archaeological sites associated with The Archaeology of Ireland's Early Modern History research program in Skibbereen, County Cork, structures this paper. The sites date from the early 1840s to the late 1920s and serve to illuminate the importance of historical archaeology to modern heritage formation, as well as the intricacies of this transformative period of Irish socioeconomic and cultural history.

[207] *Chair***Brin, Adam****[149]** *Discussant*

Brin, Adam [227] see Kintigh, Keith

Briseno, Monica (CSULA Student)**[156]** *Archaeology of Religion in Nicaragua*

This past summer I was given the opportunity to participate in an archaeology field school conducted in the country of Nicaragua. For the past 15 years, archaeologists have excavated sites along the shore of Lake Cocibolca in search for Mexican colonization. During my participation in the field school, we

continued this quest through investigations at the site of El Rayo, the most significant site for studying the potential impact of outsiders on indigenous cultural traditions. The core theoretical perspective focused on the interpretation of culture change, especially ethnicity, in the centuries leading up to the Spanish Conquest in 1522 CE. As such, the results are of fundamental importance to developing claims of cultural identity by existing indigenous groups in the region. Ethnohistorical accounts from the sixteenth century CE describe the indigenous cultures of Pacific Nicaragua, including strong evidence for shared Mesoamerican cultural and linguistic traits. Using the ethnographic information, ceramic analysis, and research I collected during my time in Nicaragua I will attempt to interpret the religious aspects of precolumbian indigenous cultures, bolstered by a cultural comparison of precolumbian indigenous cultures of Nicaragua to that of Mesoamerica.

Brite, Elizabeth Baker (Purdue University)

[285] *Irrigation Canals as Subaltern Agents of Resistance: An Example from Nineteenth-Century Russian Turkestan*

In the mid-nineteenth century, Imperial Russia established domination over "Russian Turkestan," a large territory in Central Asia. A core part of the colonial mission was the transformation of Turkestan's arid environments into productive farmland. Though this was eventually achieved by the Soviets who constructed massive new irrigation systems in Central Asia, earlier imperial authorities failed in this task and struggled for decades to wrest control of water management from local populations. In this paper, I examine this brief but significant initial period of conquest when the canals and the people of Turkestan resisted the imperial domination of the Russian Empire. Taking a turn toward new materialist perspectives, I explore how the precolonial canals themselves were important, subaltern agents of resistance that provided a basis around which humans could act to subvert authority. I consider the ways that these acts were imprinted on the material record of Central Asian landscapes, and explore how irrigation canals may be legible artifacts of resistance to imperial expansion.

Brite, Elizabeth Baker [25] see Negus Cleary, Michelle

Britt, Kelly (FEMA)

[141] *Collaborating on the Federal Level: Moving beyond Mandated Consultation in the Section 106 Process*

Collaboration versus Consultation—while both terms involve working with stakeholders, consultation implies a formulaic, reactionary response or product and can produce negative connotations while collaboration suggests a voluntary, shared method and a mutual goal, invoking more positive connotations. Within archaeology, collaboration is not a new practice. Yet within this postcolonial approach to conducting archaeology there is little discussion around what this looks like within the public sector. The National Historic Preservation Act and the National Environmental Policy Act mandates a consultation procedure with a variety of stakeholders—from state and local agencies to tribal nations and community interest groups. Since consultation as mandate is based in a colonial process and has definitive legal and bureaucratic boundaries, the question arises: can we as archaeologists working in the public sector take a postcolonial approach to required consultation? If so, how? What institutional changes are needed to enable a collaborative practice rather than merely a consultation product? And with that, how does this processual change affect methodology and theory throughout the discipline and beyond? This paper looks at areas of constraint and potential spaces for moving beyond the mandate of consultation within a federal agency, specifically the Federal Emergency Management Agency (FEMA).

Britt, Krystal (University of Illinois at Chicago)

[390] *Ceramic Production and Community Formation in the Middle Little Colorado River Valley, Northern Arizona*

As is true today, migration throughout the past had a phenomenal impact on communities through the renegotiation of cultural practices, community and social identity. Using LA-ICP-MS I investigate community formation through shared ceramic production practices in Northern Arizona during the Pueblo III period (1125–1275 CE). This paper introduces the preliminary results of ceramic compositional analysis from contemporaneous sites in the middle Little Colorado River valley. During short-term environmental fluctuations throughout prehistory the reliability of the Little Colorado River would have served as an important draw to the region. The overall environment of the middle Little Colorado River valley, as well as variability in climatic conditions throughout prehistory has contributed to widespread movement into and out of the region over time. During the Pueblo III period in particular this region experienced an influx of migrants from a variety of cultural and geographic backgrounds, providing a unique opportunity to examine how groups negotiated the social environment during periods of widespread population movement and social reorganization.

Britton, Kate (University of Aberdeen and Max Planck Institute for Evolutionary Anthropology), Edouard Masson-Maclean (University of Aberdeen), Ellen McManus-Fry (University of Aberdeen and Thames Valley Archaeology), Claire Houmard (Université Paris-Ouest Nanterre La Défense) and Carly Ameen (University of Liverpool)

[127] *The Archaeology of Dogs at the Precontact Yup'ik site of Nunalleq, Western Alaska*

Historically and ethnographically dogs have played a prominent role in the lifeways and lifeworlds of many Arctic and sub-Arctic peoples, and are considered to be a vital aspect of adaptation to living in these regions, providing protection, fur and meat, as well as aiding hunting and transportation. Excavations at the precontact site of Nunalleq in the Yukon-Kuskokwim Delta in coastal Western Alaska have uncovered a significant proportion of dog bones among the faunal assemblage. The presence of discontinuous permafrost at the site has resulted in the excellent preservation, not only of bone, but also of dog fur and even dog lice in deposits at the site, along with vast organic and inorganic material culture assemblages. Here we present a multi-stranded, cross-disciplinary study of the archaeology of dogs at Nunalleq. By incorporating the bioarchaeological analysis of dog remains (osteology, morphology, aDNA, isotopes) with the study of material culture, soils and other bodies of evidence, and the ethno-historic record, we go 'beyond domestication,' providing insight into this vital component of precontact animal-human relationships in Western Alaska and the varied roles, and significance, of Arctic North America's only precontact domesticate.

Britton, Kate [144] see Hillerdal, Charlotta

Britton, Emma, George Gehrels (University of Arizona) and Mark Pecha (University of Arizona)

[237] *Results of a New Method for Characterizing Casas Grandes Polychromes*

Through time, the analyses of archaeological ceramics have produced a diverse number of characterization techniques. These various techniques have allowed us to create multiple understandings of style, production, and exchange patterns, building a formidable tool kit that is able to speak to many aspects of human behavior. However, though our standard set of techniques is imposing and productive, they may not automatically produce datasets that naturally lead to concrete patterns and natural interpretations. For example, typically-used techniques that have successfully characterized polychromes in the American Southwest, NAA and petrography, have not led my dissertation work with Chihuahuan polychromes to clear or concrete understandings of the production and exchange of these vessels in the Casas Grandes region. This is not to say that either technique has been not-useful in exploring potential patterns. Rather, a combination of cultural choice and natural environment has colluded in making these standard methods less-appropriate techniques for this area. In response to these conditions, I will discuss the results of a pilot study of 18 Ramos and Babicora

polychromes, from across the region, using a relatively new mode of analysis, capitalizing on zircons, that could address regional issues in characterizing the ceramics of Northwest Mexico.

Brodie, Natalie [300] see Downs, Lauren

Brody, Rachel [282] see Connell, Samuel

Brokaw, Nicholas [83] see Hart, Thomas

Bronk Ramsey, Christopher (University of Oxford)

[330] *Resolving Patterns in Radiocarbon Data*

Radiocarbon is one of the most widely used chronological tools in archaeology but resolving patterns in large datasets is still difficult to achieve. This is partly due to the calibration process that itself generates patterns reflecting the changes in the radiocarbon levels within the environment. In addition, in many cases, the difficulty in obtaining sufficient numbers of measurements to draw definitive conclusions can be an issue and there is always the danger of over-interpretation. Bayesian analysis has been very powerfully used to resolve chronology in deeply stratified single sites but cannot be used in many types of archaeological research. Kernel density methods have the potential to explore less structured distributions of dates to reveal both temporal and geographical patterns. Critically they can also help to evaluate whether the datasets are large enough to answer specific questions. This paper will draw on a number of case studies with a particular focus on data on hunter-gatherers in the Baikal region.

[254] *Discussant*

Broodbank, Cyprian (University of Cambridge)

[180] *Is Mediterranean Island Colonization Still Interesting?*

Island colonization took off as a field of comparative archaeological investigation during the 1970s and 1980s, with thought-provoking analyses of regional theatres (primarily Oceanic, Caribbean and Pacific), as well as pioneering efforts to explore wider commonalities and differences between these. In the Mediterranean, the research of John Cherry sought underlying patterns and processes among a mass of empirical data, within which new evidence might find meaning and place. Such evidence has indeed accumulated, much of it affirming existing patterns but some potentially questioning earlier interpretative frameworks. This paper considers to what degree island colonization analysis remains a challenging, innovative framework for Mediterranean archaeology today, versus the degree to which it is now essentially an intellectually mined-out field of study awaiting only the last infillings of data. The focus is on the questionable discreteness of insular colonization from wider processes in this fragmented environment, the disputed significance of putative Paleolithic activity, early-mid Holocene insights from Cyprus and the Balearics, and the relatively more dynamic results to be obtained from post-colonization studies. Some implications of these considerations for global island archaeology will be proposed.

[133] *Discussant*

Brook, George A. [62] see Franco, Nora V.

Brooks, Allyson

[206] *Discussant*

Brooks, Paula [343] see Marquardt, William

Brown, David (University of Texas at Austin)

[220] *Cochasquí in Context: The Evolution of a Monumental Center*

Recent investigations suggest that the history of the northern Ecuadorian mound group at Cochasquí was complex and that the perception of the site as a single, mostly unchanging monumental center is simplistic at best. Begun by AD 1000, the earliest constructions within the complex were modest rounded mounds, several containing burials. By AD 1250, much larger, ramped square mounds signaled a major shift in site function possibly associated with the eruption of Quilotoa volcano, 125 km to the southwest. Expanded soon after the devastating eruption and occupied during a subsequent widespread drought, the new, larger pyramids were topped by round temple buildings that might have included water-related rituals. Decades of excavations have failed to find evidence of a significant population near the site and Cochasquí may have been an extra-regional pilgrimage center, at least after AD 1250. The Inka, who arrived sometime around 1500, did not destroy the site as once thought, but refurbished several pyramids within the fully functioning center, as they did at Pachacamac and Tucumé on the coast of Perú. Modern myths surrounding Cochasquí have obscured the Inka presence and little is known of the site's role in the Inka conquest and ultimate domination of northern Ecuador.

Brown, Dorcas (Hartwick College) and David Anthony (Hartwick College)

[221] *Bronze Age Economy and Rituals at Krasnosamarskoe in the Russian Steppes*

The final report of the Samara Valley Project (SVP), a U.S.-Russian archaeological investigation conducted between 1995 and 2002 in the Samara Oblast in central Russia, was published in June 2016. The SVP explored the changing organization and subsistence resources of pastoral steppe economies from the Eneolithic (4500 BC) through the Late Bronze Age (1900–1200 BC) across the steppe and river valley landscape in the middle Volga region. Particular attention focuses on the role of agriculture during the unusual episode of sedentary, settled pastoralism that spread across the Eurasian steppes with the Srubnaya and Andronovo cultures (1900–1200 BC). Three astonishing discoveries were made by the SVP archaeologists: agriculture played no role in the LBA diet across the region, a surprise given the settled residential pattern; a unique winter ritual was practiced at Krasnosamarskoe involving dog and wolf sacrifices, probably related to male initiation ceremonies; and overlapping spheres of obligation, cooperation, and affiliation operated at different scales to integrate groups defined by politics, economics, and ritual behaviors.

Brown, James (Washington State University), James Chatters (DirectAMS), Patrick McCutcheon (Central Washington University), James Feathers (University of Washington) and Steven Hackenberger (Central Washington University)

[86] *Radiocarbon Dating Versus Luminescence Dating in the Pacific Northwest*

In the Pacific Northwest of North America, the radiocarbon dating of charcoal has become the standard for assigning age to archaeological contexts. Other dating techniques are seldom used. Underused techniques like luminescence dating can apply when organic materials for radiocarbon dating are absent, unreliable or not associated with events of interest. In the Pacific Northwest, luminescence dating is beginning to be used for dating features containing fire-modified rock. By dating the last exposure to sufficient heat, luminescence has potential of high accuracy, even if precision is less than radiocarbon. Here we compare paired radiocarbon dates on charcoal and luminescence dates on fire-modified rock from seven feature contexts in three archaeological sites. A strong association between these radiocarbon and luminescence dates could justify an increased use of luminescence dating. All samples were recovered from hearth or oven features. The results of this analysis indicate a close relationship of the match-pairs within 2-sigma date ranges, indicating luminescence is a viable alternative for chronometric dating in the Pacific Northwest. The ability to date fire-modified rock features is especially important for tracing the age and distribution of rock ovens along with the intensification of plant use between 5,000 and 2,000 years ago.

Brown, Kaitlin (University of California, Santa Barbara)

[142] *Colonialism and Cuisine: Change and Continuity in Soapstone Consumption during the Contact Period in Alta, California*

This paper investigates the processes of colonialism and identity politics in the Santa Barbara Channel region through the lens of consumption. The establishment of colonial institutions became entangled with preexisting indigenous industries, thus creating change and continuity in a variety of practices. Here, I focus on soapstone vessels as they were utilized for cooking and storing foods before, during, and after the mission period. A drastic shift in the morphological characteristics of these cooking pots inside the mission space indicates a shift in food processing activities and gendered specific tasks beginning in AD 1782. I argue that this change reflects the rise of a new citizen class, one in which Christianized Indians began producing and consuming goods that were influenced by Spanish/Early Hispanic practices. I also find that the use of traditional soapstone vessels indicates the persistence of deep-rooted practices that were maintained in the historic period. By situating soapstone consumption at the center of this study, a reassessment of foodways, identity, and gender is offered in the region during the colonial period.

Brown, Kyle [40] see Schoville, Benjamin

Brown, Linda (George Washington University)

[80] *Tz'utujil Maya Ritual Practitioners, Embodied Objects, and the Night*

For contemporary Tz'utujil Maya ritual practitioners living in the highlands of Guatemala, the night is a particularly potent time and one to which they are inherently linked. Individuals often learn of their destiny to become ritual practitioners when they are first contacted by ancestral beings, known collectively as nawales, at night during dreams. Thereafter ancestral nawales and ritual practitioners enter into mutually beneficial social relationships that are mediated through sacred objects associated with the night. These objects—pre-Columbian figurine fragments, obsidian cores, greenstone celts, etc.—may look ordinary but they are far from it. Instead, they hold a unique ontological status as animate objects embodied by beings from a previous era, a dark world that existed prior to the creation of our present sun. Ritual practitioners understand that although sacred materials appear to be mundane inanimate objects by day, during this time they are resting. Reflecting their predawn origins, they become active at night when they go forth to wander the earth and conduct their sacred work. In this talk, I examine the night through the lens of contemporary Tz'utujil ritual practitioners who enter into reciprocal relationships with these embodied nawal-objects.

Brown, M. Kathryn (University of Texas at San Antonio) and Carolyn Freiwald (University of Mississippi)

[5] *Pot Luck: Building Community and Feasting among the Middle Preclassic Maya*

Ritual feasting as a practice by which sponsors create uneven social relations with other participants has been suggested to play an important role in establishing social hierarchies in many ancient societies including the ancient Maya. Feasting activities may have also been an important part of Preclassic communal building projects in the Maya lowlands. In this paper, we present data from Middle Preclassic special deposits associated with a series of early public platforms at the site of Blackman Eddy, Belize. Ceramic, faunal and botanical analyses support the interpretation that feasting activities occurred at these locations and appear to have been highly ritualized.

Brown, Mary

[175] *Rock Art as Ritual Communicator: A Theoretical Evaluation*

Archaeologists typically dissect rock art stylistically, symbolically, and chronologically. Symbols, in particular, lead to studies of representational imagery, entoptic phenomena, or religious icons. What remains underexplored is the concept of animism and its related behavioral activities. This paper applies a behavioral theory of communication to study the interactions between people and things. It uses performance characteristics analysis to determine the activities associated with attributes of rock art's natural and cultural context, manufacture traces, use wear, and maintenance. The analysis is illustrated through a case study of rock art surrounding the fourteenth century Cottonwood Springs Pueblo (LA 175), in the Jornada Mogollon of southwest New Mexico. This pilot study evaluates the potential for using a communication model to interpret rock art and similar media, such as ceramic design elements, textile imagery, and wall murals.

Brown, Thomas (University of British Columbia), Kevan Edinborough (University College London), Andrew Martindale (University of British Columbia) and Kenneth M. Ames (Portland State University)

[176] *A Radiocarbon Test for Significant Demographic Events in Written and Oral History*

We present the results of a simulation based test for the existence and significance of two known demographic event horizons. We extend the Shennan et al. (2013) summed probability distribution frequency method to provide a value of statistical significance for the period between two defined calendar dates. Case study one extrapolates population data from the Western historical record relating to the catastrophic European Black Death and finds a consistent statistically significant drop in population. Case study two uses a regionally scaled database of radiocarbon dates to test for a gap in settlement recorded in the oral historical traditions of descendant Tsimshian First Nation communities from the modern Prince Rupert Harbour region of Pacific Northwest British Columbia, Canada. Strong support for this "gap hypothesis" is found.

Brown, William (Department of Anthropology, University of Washington)

[387] *Disentangling the Demographic Consequences of Subsistence Stress and Parasite Epidemiology among the Ancestral Alutiiq of the Kodiak Archipelago*

Ecological and biodemographic perspectives on human population history emphasize changes in health and disease as key drivers of macrodemographic change. However, the approaches that demographers and archaeologists have taken to modeling the epidemiologic and demographic sequelae of food insecurity on one hand and infectious disease on the other differ in several noteworthy respects: Models addressing subsistence sufficiency and stress have tended to accommodate frequent changes in food security, driven by both environmental change and subsistence-economic reorganization, often following regionally unique trajectories. Conversely, models addressing our species' history of infectious

disease largely conform to a coarse-grained and globally generic typological account, focusing primarily on the demographic consequences of Neolithic and modern Epidemiologic Transitions. This paper presents an attempt to sync up the spatiotemporal scales of food- and infectious disease-focused population modeling, using a case study from the Kodiak Archipelago in the Gulf of Alaska. I present preliminary results of a time series analysis combining archaeological temporal frequency data with the GISP2-based paleotemperature record and time series data on regional salmon population dynamics and archaeofaunal abundances, as well as incoming archaeoparasitological data.

Browne Ribeiro, Anna (University of Louisville Kentucky)

[45] *“Um Lugar dos Antigos”: A Tiered Approach to Community-Driven Survey in Cultural Palimpsests of the Brazilian Amazon.*

The Mouth of the Xingu River, on the Lower Amazon River, is a place of many histories. The edge of the Amazon Delta, it was the first Portuguese foothold in contemporary Northern Brazil, and later home to a “glorious” nineteenth-century rubber boomtown. Centered on the city of Gurupá, the region was a major hub in the traffic of Amerindians and also marked the Western extent of African slaving networks in Luso-Amaozonia. Part of the Cabanagem revolt, place of Amazonian Jewry, export center for forest products, and locus of labor struggles, Gurupá appears in travel documents as early as 1595. But the history of the place itself is largely unknown. Survey conducted during ethnographic fieldwork among descendant Maroon communities in the municipality of Gurupá reveals that this complex history manifests in material and immaterial forms. I present results from guided tours through three territories, in which local teachers and community members presented known and unknown “places of the old ones” that structure their lives, memories and histories. Using a GPS, trowel, soil probe, and notebooks, I attempted to map the places and stories onto Cartesian coordinate grids. Gurupá emerges as a multidimensional place of historical, cultural, political, and social intersection.

[64] *Discussant*

Bruchac, Margaret (University of Pennsylvania)

[138] *Digging for Shells: Recovering Indigenous Wampum Technologies in Museum Collections*

During the salvage anthropology era, more than 400 wampum belts (woven with whelk and quahog shell beads) were removed from the hands of Native North American keepers and accessioned into museum collections. Despite the existence of a complex system of wampum diplomacy and ritual, museums often represented these belts as almost indecipherable colonial relics. The “Wampum Trail” research team (with assistance from Native knowledge-bearers and ethnographic curators) seeks to reconnect these objects with Indigenous nations, using a range of restorative methods: archival research, object cartography, material analysis, and ethnographic interviews. Close visual studies of historic belts have revealed some heretofore unexamined physical details: anomalous beads (stone, bone, clay, glass, etc.); regional patterns of twining warp and weft; evidence of repair and reuse of components; and clear distinctions among historical and modern methods of bead manufacture and belt construction. In the past, antiquarians were so intently focused on the exotic, monetary and artistic value of wampum that they overlooked details that bespeak savvy Indigenous technologies. In the present, recovery of these details resolves questions of cultural continuity, in part, by providing evidence of discernable patterns of Indigenous curation in routine repairs, re-purposing, and even reconstruction of wampum belts over time.

[334] *Discussant*

Brugere, Cecile [45] see Colonese, Andre Carlo

Bruhns, Karen (Fundacion Nacional de Arqueologia de El Salvador)

[310] *Designer Antiquities: A Current Trend in the Not so Honest Antiquities Trade*

The fine art of creating new or composite styles of (supposed) antiquities has a long and ignoble history, beginning, as far as we know for the Americas, in the sixteenth century. It appeared again, full steam ahead, with “Tlatelolco Ware” in the late nineteenth century. Today, with increasing legal controls of antiquities importation and vending, this art has arisen again. Pieces claiming to be one thing while actually being entirely new stylistic creations, given the names of popular, but little known ancient cultures or even entirely made up, exotic names, are appearing regularly at European and North American galleries. Since so many art historians are determined to be ostriches as far as forgeries are concerned—indeed, their employment often depends on it—these utterly faux creations have begun to enter what passes as legitimate studies of precolumbian art to the detriment of everyone, save, of course, the dealers.

Bruno, Maria C. (Dickinson College)

[388] *Chair*

Bruno, Maria C. [95] see Weide, D. Marie

Bruns, Laura, Elizabeth Sobel (Missouri State University), F. Scott Worman (Missouri State University) and Jack Ray (Missouri State University Center for Archaeologica)

[89] *Osage Cultural Continuity and Change in the Contact Era: Evidence from the Flaked Stone Assemblages at the Brown and Carrington Sites*

Many traditional anthropological studies used acculturation theory to understand Colonial era Native American cultural dynamics. Acculturation theory assumes a process of gradual culture change through the adoption of European culture. More recently, anthropologists have incorporated additional concepts including agency, scales of analysis, and historical silencing to more productively investigate not only indigenous culture change but also continuity during the historic period. The project reported here uses these ideas in a study of contact era continuity and change as reflected in Osage flaked stone technology. This is accomplished through analysis of flaked stone artifacts from house features and surrounding areas at two historic Osage sites—Brown and Carrington. These sites are located in western Missouri and were excavated by the University of Missouri under Carl Chapman from the 1941 through 1982. We present the research problems, methods, study sites, artifact samples, and the results of this study.

Brunson, Katherine (Joukowsky Institute for Archaeology and the Ancient World, Brown University), Lele Ren (Lanzhou University) and Jada Ko (Harvard University)

[116] *Preliminary Faunal Analysis of Qijiaping, Gansu Province*

Qijiaping in Guanghe County, Gansu Province is the type site for the Bronze Age Qijia Culture (ca. 2200–1600 BC). In July of 2016, the Tao River Archaeological Project began small-scale excavations at Qijiaping. We present a preliminary analysis of the faunal remains uncovered during these excavations. Pigs and sheep were the most commonly identified specimens. Additional identified taxa include large bovines (probably domestic cattle), dog, deer, small rodents, and an unidentified wild bovid. Other notable findings include a fairly complete corvid skeleton and two divinatory oracle bones. Our analysis makes an important contribution to the limited zooarchaeological data for this period.

Brunson, Katherine [116] see Lyu, Peng

Brush, Emily (University of Wyoming), Lawrence Todd (GRSLE) and Rachel Reckin (University of Cambridge)

[88] *Analysis of an Obsidian Source from the Cougar Pass Region of the Absaroka Mountain Range*
Obsidian samples from a variety of sites across Northwest Wyoming have been sourced using X-ray fluorescence and analyzed in order to determine the importance of a relatively unheard of source from the Cougar Pass region of the Absaroka Mountain Range. Artifacts manufactured with obsidian nodules from Cougar Pass have been found in archaeological contexts across Northwest Wyoming, extending as far as a presently unknown kilometer range from their source. The wide range of specimens from a selection of sites within the Absaroka Mountain Range and surrounding areas demonstrate the varied use of the Cougar Pass obsidian source and highlight the rich archaeological importance of high elevation occupational areas. Further investigation into the use of the Cougar Pass obsidian source will help to determine the spatial-temporal significance of the region as a whole.

Brush, Emily [345] see Todd, Lawrence

Bryant, Jeff, Robert Feranec (Vertebrate Paleontology, New York State Museum), Nayeli Jimenez Cano (Biology, Universidad Autónoma de Madrid) and Marilyn Masson (Department of Anthropology, State University of N)

[44] *Investigating Seasonality of Fishing and Trade during the Maya Postclassic, with Otoliths Thin-Sections from the Inland Site of Mayapán*
This paper will offer preliminary results of fish otolith thin-section growth ring analysis from the Postclassic archaeological site of Mayapán, Yucatán, Mexico. This study offers the first use of otoliths for investigating seasonality of the fish trade in the Yucatán, utilizing perhaps the largest collection of otoliths from an inland site in the Maya world. Data on seasonality, age, and size of several fish species are presented, and discussed in the context of trade ethnohistory, ecology, and fish trade sourcing.

Bryant, Paula [341] see Hanson, Kelsey

Bryce, Joseph [181] see Lambert, Spencer

Bryce, William (Southwest Archaeology Research Alliance) and Michael L. Terlep (Logan Simpson)

[140] *From the Canyon to the Staircase: Expanding the Paleolithic Presence in the Arizona Strip*
Evidence of Paleoindian and Paleo-Archaic occupation of the Arizona Strip, in northwest Arizona and southwest Utah, largely remains limited to isolated projectile points found lying on the modern ground surface, dispersed across large swaths of land. Building upon the few isolated finds, this presentation discusses the recent identification of multiple fluted and unfluted lanceolate and Great Basin Stemmed projectile points. In contrast to the few previously known finds, the various projectile points and types presented here were spatially concentrated within a narrow 23 km (17 miles) corridor near Kanab Creek Canyon in northwest Arizona. After a discussion of the newly documented points we incorporate Paleoindian projectile points from the North Rim of the Grand Canyon and southern Grand Staircase-Escalante National Monument in southwestern Utah to provide additional data and inferences into the Paleoindian and Paleo-Archaic occupation of the Arizona Strip.

Brzezinski, Jeffrey (University of Colorado Boulder)

[82] *Recent Excavations at Cerro de la Virgen, Oaxaca, Mexico*
This paper presents the preliminary results of recent excavations carried out at Cerro de la Virgen, a 92-ha hilltop site located in the lower Río Verde Valley of coastal Oaxaca, Mexico. The lower Verde's first complex polity emerged during the Terminal Formative period (150 BCE—CE 250), during which Cerro de la Virgen was one of several secondary political centers distributed around the region's political seat, Río Viejo. Current research at Cerro de la Virgen is designed to study the negotiations that took place between secondary centers and polity leaders by examining the scale at which political, economic, and religious resources were controlled. Excavations carried out in the spring of 2016 targeted public and domestic architecture to examine resource control within communal and household settings. Preliminary evidence indicates that architectural patterns and ceremonial caching practices at Cerro de la Virgen differed significantly from those witnessed at other Terminal Formative sites in the lower Verde, including Río Viejo. These data suggest that the region's first complex polity collapsed at ca. CE 250 because hinterland populations were not integrated into the political system managed by leaders at Río Viejo.

Brzezinski, Jeffrey [82] see Barber, Sarah

Buchanan, Briggs [197] see Williams, Nancy

Buchanan, Kate (Western Washington University)

[186] *Castles and Their Landscapes: A Gravity Model Experiment*
Castle studies in recent years has developed two major themes in developing technology: landscape studies and spatial analysis. Studies of castle landscapes have shown that external spaces were intensively used and a significant part of the space actively portrayed as noble environment. Spatial analysis has been key in identifying spaces of control, privacy, and household interaction within the castle structure. One of the limitations of spatial analysis in castle studies is the failure to include external spaces as an option for social interaction. Including external spaces raises questions about how the physical layout of the entire castle property affected the ways people interacted with these external features and which features and external spaces might be more attractive than others. Therefore, a methodology that includes the assessment of external spaces is sorely needed. This paper discusses the gravity model as a new method for analyzing the landscape features of castles in Scotland. This study also strives to open up a dialogue about new methods and technologies for quantifying interaction with the medieval noble landscapes.

Buchli, Jonas [40] see Iovita, Radu

Buck, Paul (Nevada State College/Desert Research Institute) and Donald Sabol (Desert Research Institute)

[250] *Sub-Pixel Detection of Obsidian and Pottery by NASA Satellite and Aircraft Data*

We determine the detection limits of sub-pixel artifacts (site midden, obsidian artifacts, and pottery) using airborne and spaceborne image data. Research results are presented from the Glass Mountain Site in northern CA and the Boquillas site in southern Arizona. Multiple visits were made at different seasons over three years. Visible, SWIR, and TIR spectral characteristics of targets and background were measured in the field. A spectral library has been constructed from ~200 target and background samples. The average density of these artifacts (per m²) has been calculated for 25 8 × 8 m squares and 10 4 × 4 m squares. Image data include: NASA's MODIS/ASTER airborne simulator (MASTER) imaging system, the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS), and the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER). We (1) determined the detection limits of obsidian and ceramic artifacts at the sub-pixel scale; (2) examined the influence of background, seasonal vegetation change and other on-site changes on the detectability of these artifact types; (3) established the instrumentation, spatial scale, and spectral bands needed to improve the detectability; and (4) tested predictions of new locations for obsidian artifacts at specific (spatial) densities in other image scenes and ground truthed these predictions.

Buckberry, Jo [139] see Armit, Ian

Buckley, Gina (Pennsylvania State University), Rebecca Storey (University of Houston), Scott Hynek (Pennsylvania State University), Kenneth G. Hirth (Pennsylvania State University) and Douglas J. Kennett (Pennsylvania State University)

[8] *Diet and In-Migration in the Tlajinga District of Teotihuacán: New Insights from Stable Isotope Analysis and AMS Radiocarbon Dating*
Thirty years ago, the apartment compound known as Tlajinga 33 (33:S3W1) in the southern district of Teotihuacán was extensively excavated, resulting in the recovery of over 100 individuals. A paleodemographic study of these individuals indicated that chronic morbidity was a serious health issue among residents. Additionally, previous geochemical analysis from 25 of these individuals suggested that at least 29% of residents grew up outside of Teotihuacán. Due to chronic health issues, the movement of high numbers of in-migrants from outside the district into Tlajinga would have been important in order to maintain population numbers. In this new study of the Tlajinga district, both hypotheses concerning diet and in-migration are directly tested using stable isotopic analysis. Here, 25 additional individuals from Tlajinga 17 (17:S3E1), 18 (18:S3E1), and 33 are analyzed for carbon ($\delta^{13}C$) and nitrogen ($\delta^{15}N$) stable isotopes to better understand dietary variation between individuals. Stable oxygen ($\delta^{18}O$) isotopes and radiogenic strontium ($^{87}Sr/^{86}Sr$) are measured in human tooth enamel to estimate the extent of in-migration at Tlajinga. Additionally, AMS radiocarbon dates from bone collagen are used to build a more precise chronology. Results shed new insights into the demographic profile of the Tlajinga district.

Buckley, Gina [13] see Storey, Rebecca

Buckley, Michael

[85] *Zooarchaeology by Mass Spectrometry (ZooMS) and Rethinking a Definition of NISP*
Biomolecular methods can vastly improve the confidence in species determination of animal bone in a manner that, unlike traditional morphology-based methods, is not subject to the skills of the analyst. Until recently these have largely focused on ancient DNA-based approaches, and so have been at costs too great to become widely used for most archaeofaunal assemblages despite being available for more than 30 years. However, within the last decade I have pioneered the development of a low-cost biomolecular method of species identification based on using soft-ionization mass spectrometry to fingerprint enzymatic digests of collagen—the most abundant protein in bone. Termed “ZooMS” (for Zooarchaeology by Mass Spectrometry), appropriate given the speed at which objective identifications can be made with this approach, this approach in recent years has been applied to thousands of bone fragments in some cases. However, it remains unclear to what extent we can utilize such large-scale approaches beyond improving our understanding of the presence or absence of particular taxa. This presentation considers the advantages of ZooMS, including its temporal ranges across the planet and taxonomic resolution but more importantly its limitations, particularly in light of how to accommodate such highly enhanced NISP counts in archaeofaunal analyses.

Budar, Lourdes (Universidad Veracruzana)

[10] *Los puertos prehispánicos y los problemas político-económicos en la Costa Este de Los Tuxtlas, Ver.*
Recientemente, en la zona costera de la Sierra de Santa Marta en Los Tuxtlas, Ver., se lleva a cabo la investigación de un sistema portuario prehispánico. En esta contribución se mostrará visualmente el impacto político y económico que tuvo este sistema en la región.
[10] *Chair*

Budd, Tommy (Arizona State University)

[113] *A Biodistance Study of Shang Dynasty Human Sacrifice*
Ongoing archaeological investigations at the Shang capital of Yin Xu in modern Anyang have contributed much to the understanding of the Shang Dynasty (~1600–1046 BCE) and Bronze Age China. Bioarchaeological investigations of the thousands of sacrificed individuals recovered from the royal cemetery at Yin Xu has historically been somewhat limited, but is becoming an important component of current research at the site. Earlier work focused mainly on collection of craniometric data and the typology of collections. While bioarchaeology has moved away from typology and toward a more nuanced and contextualized understanding of population structure and history, the craniometric data collected and published with these earlier studies remain a valuable resource. This project uses this data to explore the structure and history of a sample of the population of sacrificed individuals at the site of Yin Xu using a biodistance approach. The structure and microevolutionary history of the sample are investigated in order to contribute to the understanding of the practice of human sacrifice by the Shang and the relationships between the Shang and those sacrificed.

Budden-Hoskins, Sandy (Archaeopots/UJAIK)

[208] *Tracing Purpose: An Emic View of Pottery Making in Prehistory and Beyond*
Archaeologists have, until recently, tended to study pots in what I view as an outside/in or etic manner. We have looked at size, form, decoration and touched on the manner of making only insofar as a pot being hand-built, wheel-thrown, or cast. However, by developing a profoundly emic understanding of potting, as performance, we have a tool that can allow us to view the entirely social and shifting cultural nature of a particular genre of pots. In 2007 I developed a skill methodology that has been used successfully on a number of European prehistoric assemblages. In 2015 the methodology was applied to the indigenous pottery of Taiwan, including that of the Paiwan. I will discuss the results of this research and what I believe it reveals about the shifting social nature of this pottery genre and what this may mean for an understanding of prehistoric pottery in Taiwan.

Budhwa, Rick (Crossroads Cultural Resource Management), Dana Evaschuk (Crossroads Cultural Resource Management), Donald Dixon (Canim Lake Indian Band) and Jocelyn Franks (Crossroads Cultural Resource Management)

[17] *Green Lake Burial Grounds: An Unprecedented Collaboration in Shuswap Territory*

Located atop the shores of Green Lake, and on Shuswap First Nation traditional territory, a First Nations burial site was slumping into the water. Long bones began emerging 40 years ago, when the local landowner was just nine years old. In 1997, archaeologists relocated one burial; but up to 15 individuals remained in this sliding cemetery. Since 1997, provincial government Archaeology Branch has worked toward moving those individuals. In July of 2013, Crossroads Cultural Resource Management worked in collaboration with other industry agencies and four First Nations to relocate these individuals. This project is historic in British Columbia, as Archaeology Branch acted as the client for the first time. Moreover, in another industry first, two distinct cultural resource management firms collaborated on the overall management of the project—one focused on archaeological recovery, and the other on sociocultural aspects of past and present peoples. The Canim Lake Indian Band has since purchased the site. They plan to make it into a memorial. The success of this project is attributed to the emphasis on intangible cultural aspects surrounding archaeological recovery and First Nations protocols, which will be the focus of this presentation.

[17] *Chair*

Buehlman-Barbeau, Savanna (University of Wisconsin-Madison, Anthropology), Kristin Carline (University of Louisiana at Lafayette, Anthropology), Jennifer De Alba (University of California Santa Barbara, Anthropology) and Erik Marsh (CONICET, Laboratorio de Paleo-Ecología Humana, UNC)

[231] *Excavation and Survey in the Argentine Andes: Preliminary Field Report of the First IFR Field School in Uspallata, Mendoza*

The first field school in the Uspallata valley, Mendoza, took place in 2016 and was organized by the Institute for Field Research (IFR). Its goals were to clarify the use of the landscape over the last two thousand years by people with an economy that incorporated hunting, gathering, small-scale agriculture, and possibly llama herding. Research was near one of Mendoza's best known archaeological sites, Cerro Tunduqueral. This site's dense rock art has been known for decades, but little is known about the people who made the engravings. Excavations at the adjacent cave site Tunduqueral 1 revealed 1.6 m of cultural deposits dominated by lithic artifacts and a major hearth feature. Ceramics were absent and faunal remains were poorly preserved, with the exception of Rhea Americana eggshell. Typologically early tools hint that the initial occupation was as early as the Middle or Early Holocene. Systematic surface collections in the same area revealed extensive concentrations of ceramics, ground stone, and lithics, remnants of activities in seasonally active alluvial plains. People's movements around the landscape probably included seasonal occupations of all three places: long occupations near streams, brief stays at the rockshelter, and making rock art at Cerro Tunduqueral.

Bueno, Marilyn [11] see Saldana, Melanie

Buff, Lindsay (Hamilton College), Nathan Goodale (Hamilton College), Heather Kendall (Stantec), David G. Bailey (Hamilton College) and Anna Marie Prentiss (University of Montana)

[50] *Sourcing FGV Artifacts Recovered from Housepit 54, Bridge River Housepit Village, British Columbia*

Geochemical analysis of trace elements in fine grained volcanic rocks (FGV) using HHpXRF technology allows elemental characterization that enables matching fine grained volcanic artifacts with their original toolstone sources. Excavations of Housepit 54 during 2013–2016 field seasons have yielded a large assemblage of FGV artifacts that we attempt to match with toolstone sources or outcrops in the region. Preliminary research on characterizing artifacts recovered during the 2013 field season through mineralogical and elemental analysis noted two dominant chemical groups, likely indicating two distinct sources. One of the distinct chemical groups of artifacts shares elemental similarity with the Arrowstone Hills volcanic deposits. During the summer of 2016, further field survey in the region identified several more possible local toolstone sources, including both young volcanic deposits and glacial deposits featuring fine grained volcanic cobbles. This paper further explores the use of FGV through the entire occupation of HP54, allowing an important understanding of shifting toolstone acquisition during the use life of the pithouse.

Buffalo, Johnathan [341] see Noldner, Lara

Bugg, Travis [301] see Terlep, Michael L.

Buhay, Bill M. (University of Winnipeg), Yadira Chinique de Armas (University of Winnipeg), Mirjana Roksandic (University of Winnipeg) and Roberto Rodriguez Suarez (University of Havana)

[30] *A Bayesian Model Sensitivity Study of Non-Static Diet-Collagen Isotope Fractionations Factors Used to Assess Breastfeeding and Weaning Practices among Fisher-Gatherers Populations, Western Cuba*

Reconstructing pale diets from bone-collagen isotope values (carbon and nitrogen) requires proper knowledge of diet-collagen isotopic fractionations ($\Delta d_{13}C_{diet-col}$, $\Delta d_{15}N_{diet-col}$). While these isotopic fractionations vary considerably among previous human pale diet reconstructions, some more recent studies have successfully employed "non-static" dietary offsets. New research suggests that non-static diet-collagen isotope fractionations is best when attempting to reconstruct pale diets of cultures consuming varied diets, particularly when used in association with a variety of new Bayesian multisource stable isotope-mixing models now available. This particular study involves a sensitivity study of some non-static diet-collagen isotope fractionations employed in three Bayesian multisource stable isotope-mixing models to assess breastfeeding and weaning practices among fisher-gatherer populations from Western Cuba.

Buhay, Bill M. [69] see Kanik, Nadine

Buikstra, Jane E. (Arizona State University) and Jason King (Center for American Archeology)

[31] *A Prism or a Mirror? Reflections of a Hopewell Man*

Interred within a deep, mounded and relatively elaborate tomb nearly two millennia ago, our Hopewell man lived approximately as many years as we have studied his remains. While his tissues have remained unchanged since excavation, our analytical gaze has witnessed near tectonic shifts in theoretical perspectives. The first interpretations, those of the senior author in zealous pursuit of her doctoral degree, were decidedly processual and lacked reflexivity. She spoke of status, for example, identifying our subject as one who had controlled disproportionate resources in life and after death. Today, having absorbed the post-processual critique and currently engaging the challenges inherent in interpreting intersecting identities, we return to our Hopewell man and his Illinois River valley community. How has his/our viewpoint changed across so many theoretical approaches, informed as well by increasingly sophisticated analytical methods? In this presentation we first consider fundamental mid-twentieth century distinctions between bioarchaeological and osteobiographical approaches. Then we turn to interpretations colored by postprocessual visions of worldview. Finally, we enter a new osteobiographic interpretative arena informed by agency, embodiment, personhood, and identity theories. Our assumption throughout is that osteobiography is a prism through which we view a community—or perhaps it is a mirror?

[276] *Discussant*

Buikstra, Jane E. [102] see Charles, Douglas

Bull, Ian [367] see Shillito, Lisa-Marie

Bullard, Tom [140] see Cunnar, Geoffrey

Bullion, Elissa (Washington University in St. Louis)

[221] *Biological Diversity in Medieval Uzbekistan: Examining Community Expression under the Qarakhanid State*

This paper examines the expression of community during the Qarakhanid period (ninth–twelfth century CE) through a study of patterns of phenotypic diversity at medieval sites across Uzbekistan. The Qarakhanid dynasty is argued to be an integral period in the shaping of population, linguistic, and religious frameworks that shaped the social and ethnic landscapes of Central Asia up through the modern day. Historical sources suggest that the Qarakhanid rise to power instigated an in-migration of Turkic populations, the spread of Islam across the region, and the cultivation of Turkic language and culture. Little archaeological work has been done, however, to investigate how community interaction and expression was affected by these activities. In this study, geometric morphometric analysis of cranial shape is used to understand levels of biological diversity and association between groups at a collection of sites that cover a range of environmental, geographic, and economic contexts. Results indicate that biological expressions of community are variable across the landscape and are likely dependent on complex social and environmental contexts. This suggests that despite Qarakhanid sponsored cultural and religious campaigns, community expression was still in part mitigated by a range of variables, spanning economic, ethnic, and other social spheres.

Bullion, Elissa [29] see Frachetti, Michael

Bundala, Mariam [305] see Mercader Florin, Julio

Buonasera, Tammy (University of Arizona), Shelby Anderson (Portland State University), Shannon Tushingham (Washington State University) and Andrew H. Tremayne (National Park Service)

[173] *Animal Fats and Ancient Pyro Technologies in the North American Arctic: Contextualized Analysis of Lipids in Archaeological Sediments, Combustion Features, and Ceramics*

Processing and combustion of animal products including bone, fat, and oil for food and fuel was critical for human occupation of far northern latitudes. Remnant fats from these activities preserve exceptionally well in many Alaskan sites and various sources can be identified using standard techniques of lipid analysis. Combining lipid analysis with ethnographically informed experiments and high-resolution analysis of archaeological sediments, combustion features and ceramics, could help trace the use and processing of various animal products for food and fuel in Alaskan prehistory. Interpretive highlights of several recent studies will be discussed, as will directions for future analysis.

Burchell, Meghan (Memorial University)

[22] *Sustainable Research in Archaeological Science: Examples from High- and Low Resolution Biogeochemical Studies of Archaeological Shell*

Advances in archaeological sciences demonstrated the (almost) unlimited potential to apply new methods and techniques to existing and underutilized archaeological collections. Developing programs of research using innovative and multidisciplinary approaches to the analysis of material cultural, hard tissues, sediments and organic remains are critical to move the discipline of archaeological sciences forward. More critical, is the balance between technical skills one learns to become an 'archaeometrist' while still being rooted in contemporary anthropological theory. This paper discusses the results shell biogeochemical data, specifically oxygen and carbon isotopes and micro-growth patterns from sites across Canada British Columbia, Ontario and Newfoundland, revealing patterns of trade, seasonality, and landscape use over the past 6,000 years. By combining low- and high-resolution studies on hard-tissues, such as shell, bone and teeth from existing collections, archaeologists can build sustainable archaeometric research programs to develop new environmental proxies and interpret past cultural, historical and natural environments.

[223] *Discussant*

Burchell, Meghan [18] see Cook, Katherine

Burgess, Don [390] see Lyons, Patrick

Burgos, Walter [71] see Barrios, Edy

Burham, Melissa (University of Arizona)

[204] *Ancient Urbanites: The Spatial and Social Organization of Outlying Temple Groups at Ceibal, Guatemala*

Recent investigations of minor temple groups at Ceibal, Guatemala shed light on the social and spatial organization of ancient Maya cities. Many researchers suggest that minor temples were important integrative hubs in lowland Maya settlements. Because minor temples were constructed at regular intervals around the urban epicenter of Ceibal, it appears that they were integral to city planning, and likely the centers of localized communities. Although they may have been discrete social units, the formation of these "intermediate" groups was crucial to shaping and sustaining the larger sociopolitical order. This research investigates community organization at Ceibal by: 1) assessing the existence of spatially-distinct residential zones organized in association with at least one temple; 2) evaluating variations in material culture across different residential zones; and 3) identifying local sources of water within each zone, which would have been important loci of routine interactions and crucial for supporting local populations. A diachronic assessment of multiple lines of evidence provides a basis for more clearly identifying and understanding how intermediate social groups at Ceibal formed and articulated with the larger society. More broadly, this paper provides methodological and theoretical approaches for studying different levels of community organization among the ancient Maya.

Burke, Adrian (Université de Montréal)

[216] *Traditional Knowledge and Lithic Sources in Northeastern North America*

Northeastern North America contains numerous lithic sources that are found in a variety of geologic and geographic settings. These materials vary widely in their knapping quality, color, texture, translucency, and block/cobble size. Access to these sources can also vary greatly, from underwater to the top of mountains. Aboriginal traditional knowledge allowed people in the past to navigate and use these varied sources. I present data from ethnographic and ethnohistoric documents that provide an insight into this traditional knowledge in precontact times. Toponyms point to lithic sources in the physical landscape that were known for generations. Oral traditions indicate that several sources in the Northeast possessed important symbolic meaning as part of the cultural landscape. I also explore how this traditional knowledge can help the archaeologist to better understand the exploitation of these lithic sources and their importance, whether symbolic or economic, to Aboriginal societies in the Northeast.

[216] *Chair*

Burke, Ariane (Université de Montréal), Colin D. Wren (University of Colorado) and Julien Riel-Salvatore (Université de Montréal)

[165] *The Social Consequences of Climate-Driven Changes in the Spatial Distribution of Human Populations during the Last Glacial Maximum (LGM)*

Risk-reducing strategies allow humans to manage ecological risk while minimizing disruptions. Unpredictable resource fluctuations, i.e., ecological risk, are driven by a combination of climate conditions and climate variability. Under extreme conditions reduction strategies may fail, however, forcing a reorganization of the social and economic structure of affected populations, as well as their technological systems. Risky conditions during the LGM, for example, affected the spatial distribution of populations in Western Europe as well as the ease and frequency of interregional mobility. This will have had an impact on human social networks and cultural exchange. Using predictive modeling, climate simulations and agent-based modeling, we explore how a risk-averse strategy created the spatial patterns observed in the archaeological record and consider their social consequences.

Burke, Chrissina C. (Northern Arizona University), Katie Tappan (Northern Arizona University), Gavin Wisner (Northern Arizona University) and Gregory Allen (Northern Arizona University)

[321] *Ritual Fauna Use in an Elite Ancient Maya Burial: Examination of an Animal Long-Bone Cache in the Recently Discovered Royal Tomb at Xunantunich, Belize*

Animal use in elite burials can provide a more holistic perspective on the importance of specific fauna as prestige goods or as status and power markers in the Maya world. This presentation discusses a discrete cache of animal long-bones located at the feet of a human burial recovered from the newly discovered royal tomb at Xunantunich during the 2016 field season of the Belize Valley Archaeological Reconnaissance (BVAR) project. Maya zooarchaeologists have long held that the use of specific species or the identification of right or left sided elements in ritual contexts can indicate cultural ideas of masculinity, power, or social status. This presentation discusses the results of analysis, specifically skeletal elements recovered, species identification, and taphonomic signatures present to determine if these faunal remains can contribute to our greater understanding of the individual buried in the tomb and help us better understand fauna in Maya ritual.

Burke, Chrissina C. [7] see Wisner, Gavin

Burkholder, Jo (University of Wisconsin–Whitewater)

[273] *Pisanay and the Endangered Rock Art Traditions of Arequipa, Peru*

Drawing on the archaeological excavations at the site of Pisanay, located in the Sihuas Valley of Arequipa (southern) Peru, this paper will situate the rock art at the site within the broader contexts of multiple rock art traditions in the region. These traditions include both painted and pecked images on rock surfaces, a wide variety of geoglyphs, mobiliary art, and sacred offerings made to particular rocks and geographic landmarks that represent huacas (loosely 'holy places'). Within the boundaries of the Pisanay site, both pecked designs (petroglyphs) and mobiliary art have been found, but Pisanay also appears to occupy a central location within the broader sacred geography of the valley and surrounding pampa, a geography defined by a variety of geoglyph styles. The need to document, and hopefully date, these sites has increased in recent decades as the economic development associated with the Majes Irrigation Project, one of the largest in the world, has begun to endanger not only individual sites, but whole sacred landscapes. To date preservation efforts have been minimal, challenged by both economic forces and a lack of awareness of the rich rock art traditions.

Burks, Jarrod (Ohio Valley Archaeology, Inc.)

[283] *Mapping Residential and Public Space in Cahokia's Merrell Tract: Results of Recent Magnetic Surveys*

The Merrell Tract is located west of Monk's Mound and just outside downtown Cahokia. It is well-known for excavations of the famous Woodhenge at its west end and a large residential district at the east end. However, very little is known about what lies between. In 2012 and 2013, with logistical funding from the Cahokia Mounds Museum Society and the Illinois Association for Advancement of Archaeology, a large-area magnetic survey was undertaken to determine the density and extent of the area's archaeological features. Though their magnetic signatures proved to be quite subtle, many dozens of pit features and houses from various time periods were detected. Also notable are large areas lacking features. In this presentation I review the results of the magnetic surveys and situate them alongside earlier excavation data. These recent geophysical surveys continue a long tradition of the use of remote sensing data at Cahokia for examining site structure, and they further show the utility of even larger-area surveys.

Burley, David

[180] *Small Island Adaptations in the Initial Colonization of Fiji and Tonga*

Current research into the earliest Lapita occupation of Fiji and Tonga emphasizes the importance of small offshore island settlement choices for founder populations. Associated faunal data typically illustrate reliance on reef and marine resources that, in turn, have resurrected 1960s "strand looper" interpretations for Lapita economy, with little to no reliance on agricultural production. Recent studies at early Lapita sites at Kavewa (northern Fiji) and Nukuleka (southern Tonga) provide an alternative view, including use of freshwater wetlands and planting pits for reliable taro yields.

[123] *Discussant*

Burns, Gregory (University of California, Davis)

[381] *Ancient Origins of Ethnographic Shell Bead Money in Central California*

Far from providing a bounty that obviated agriculture, the California acorn economy presented risks of secular variation more extreme than experienced by other densely populated hunter-gatherers. Decentralized political organization and high ethno-linguistic diversity further complicated redistribution of spatio-temporally variant resources. In the ethnographic period, shell bead money played a key role in enabling exchange. We examine changing patterns in bead manufacture and distribution through time to identify when and how beads took on this role, and suggest how the development of money may be tied to broader social and demographic developments in ancient California.

[381] *Chair*

Burns, Jessica L. [156] see Cooper, Catherine G.

Burns, Samuel (Independent Researcher) and Beau Kromberg (Wayne State University)

[91] *A 3D Method for Measuring Platform Angles on Lithic Flakes*

The measurement of platform angles on lithic flakes by hand is notoriously difficult, and is plagued by intra- and inter-observer variability. The measurement method proposed in this poster uses 3D models of flakes loaded into Blender, a free open-source 3D design program. After identifying the platform, two points (a) and (b) are defined at the intersections of the left and right lateral margins and the platform. A line (a-b) is drawn between these two points, ignoring any platform roundedness or complex faceting. A line (d-e) is drawn that intersects the midpoint of line (a-b) at a 90 degree angle and that terminates in points (d) and (e) on the intersections of the ventral and dorsal faces with the platform. Next, a flat plane that bisects line (a-b) at a 90 degree angle is drawn through the flake. A point (f) can be chosen at any point where this plane intersects with the ventral and dorsal side of the flake, and the angle between line (d-e) and lines (d-f) and (e-f) can be accurately measured using built-in tools, giving a well-defined, replicable measurement of interior and exterior platform angles.

Burrillo, R. E. (University of Utah)

[371] *Behind the Bear's Ears: Climate and Culture in the Early Pueblo Era on Elk Ridge, Southeast Utah*

The Pueblo I period was a time of tumultuous throughout the Four Corners region. Long regarded as an era of gradual transition, it is now recognized by most authors as a discrete and decisive turning point in North American prehistory. While this topic has been studied extensively in the central Mesa Verde area of southwestern Colorado, very little formal research has occurred for the early Pueblo era in southeast Utah. The high uplands area of Elk Ridge contains probably the greatest concentration of Pueblo I sites in this region. Cultural resource inventories on Elk Ridge itself, and an extensive published literature on nearby landforms like Cedar Mesa, comprise a useful dataset for investigating the early Pueblo archaeology of southeast Utah. This study presents a synthetic analysis of Pueblo I settlement patterning in the Elk Ridge area in terms of climatic and environmental factors.

Burrillo, R. E. [290] see Lewis, Michael D.

Burt, Amanda (Indiana University)

[127] *Hard Fare: Investigating Dog Teeth to Interpret the Value of a Dog among Northwestern Plains and Rocky Mountains*

In this paper, Dental Microwear Texture Analysis is used to evaluate the teeth of dogs recovered from Late Prehistoric sites to investigate the idea that these animals had their natural diets modified by their human counterparts. This study compares microwear from wolves (*Canis lupus*) and coyotes (*Canis latrans*) to that of archaeological dogs recovered from various sites that represent human mobile groups of the Northwestern Plains and Rocky Mountains. Varied practices have been described in the ethnohistoric record, including Native groups intentionally provisioning their dogs as well as letting them subsist solely by scavenging. Understanding feeding programs as a proxy for the value of the dog among indigenous groups will contribute to continuing investigations on how dependent humans and dogs were on each other and the significance of dogs in general. Typical ecological models measure value as a compromise between what is given and what is received. This approach to understanding human behavior can be applied to the use of dogs and may inform fundamental anthropological questions about people and their environmental interactions in the past.

[127] *Chair*

Busacca, Gesualdo (Stanford University)

[73] *The Long Life of the Transient: Investigating Painted plasters at Çatalhöyük*

During the two decades of the Çatalhöyük Research Project, painted plasters have been investigated using a wide array of methodologies and theoretical perspectives, spanning from contextual to experimental approaches, and from iconographic classification to archaeometric analyses. While the transient character of Çatalhöyük paintings has often been discussed, the longer life-cycles of entire plaster sequences have rarely been investigated. Using a mixed methodology that combines block sampling, excavation tests, photogrammetric techniques (3D modeling and Reflectance Transformation Imaging) and archival research, a new dissertation project has started to investigate how painted surfaces at Çatalhöyük changed over time. For instance, how often were walls painted and where are painted layers placed in the sequence of plasters? How do earlier painted layers relate to later ones? Were paintings always covered by successive plaster layers or were they preserved and repaired in some cases? Preliminary research shows a remarkable variability in plaster sequences across the site and suggests that some paintings were less "transient" than others, being retouched and repaired after the first painting event. This paper will discuss these preliminary results and their implications on previous interpretations and research practices at Çatalhöyük.

Busby, Ashley (Texas Tech University)

[126] *From Viewer to Observer: Analyzing Spatial Complexity of Pictographs in the Lower Pecos*

From Viewer to Observer will discuss the visual elements of the Pecos River style rock art, exploring the painting techniques and patterns that created these complex spaces. In addition, this paper will examine Lower Pecos pictographs through David Summers's Real Spaces, as well as other texts, to create a context within current and traditional art historical methodologies. In using Summers's idea of the spatially aware "observer" instead of the "viewer" I hope to expand the boundaries of the traditional composition to incorporate the physical space these works of art occupy, which enhance their spatial complexity as paintings. Analysis of the pictographs within their respective settings can deepen our understanding of the formal qualities of these paintings, and further, reveal interactions between image, surface, and surrounding space. By expanding our understanding of how meaning was communicated through the art and how it formed part of the culture within which it was produced, we gain insights into the cognitive behaviors which underlie Pecos River style imagery.

Büster, Lindsey (University of Bradford, UK) and Ian Armit (University of Bradford, UK)

[68] *Violence, Politics, and Power: Iron Age and Pictish Reinventions of a Prehistoric Mortuary Landscape at the Sculptor's Cave, NE Scotland*

The Sculptor's Cave in NE Scotland saw a long history of use, from the Late Bronze Age to the Early Medieval (Pictish) period. Late Bronze Age activity is characterized, as in other caves along this stretch of coast, by complex communal funerary practices involving the exposure and processing of human bodies. Veneration continued for many centuries, yet by the Roman Iron Age (c. third century AD) perceptions of the cave had markedly changed. During this period, several adults were decapitated inside the cave, an event which can be situated in the political power struggles following Roman withdrawal from northern Britain. Scenes depicted on the nearby "Sueno's stone" attest to similar practices later in the Pictish period, and may even relate directly to those which took place in the Sculptor's Cave itself. The carving of enigmatic Pictish symbols on the cave walls in the Early Medieval period attests to the enduring memory of this place and the events which took place there. This paper will explore the changing use of the Sculptor's Cave and chart its contested role in this shifting political landscape.

Büster, Lindsey [139] see Armit, Ian

Bustos-Ríos, Diana (Posgrado en Antropología, UNAM) and Ana Itzel Juárez-Martín (UNAM)

[119] *Entre genes y memes: estudios de paleogenética de poblaciones en el México antiguo*

El centro de México ha sido una región de convergencia y tránsito de ideas y mercancías desde la época prehispánica. Los grandes centros urbanos del Clásico y del Posclásico se caracterizaron por un constante trasiego que alcanzó desde el actual centro de México hasta Centroamérica. La intensidad de este intercambio desde épocas muy tempranas consolidó el complejo cultural mesoamericano principalmente identificado por la iconografía. Sin embargo no sólo las ideas y las mercaderías viajan, también las personas entran en contacto. Nosotros nos hemos dedicado al estudio de la variabilidad poblacional en el México antiguo a través de los estudios de ADN mitocondrial y proponemos que los ritmos de cambio y continuidad cultural tienen un impacto en la composición de las poblaciones: guerra, migración, cambios climáticos y nuevas alianzas comerciales y matrimoniales constituyen fenómenos incidentes en la deriva y el flujo génico. El análisis de las distancias genéticas y su contrastación con la información arqueológica e histórica permite conocer desde otro enfoque, la variabilidad de los grupos biológicos presentes entre los pueblos mesoamericanos. En el caso de estudio, estudiamos colecciones osteológicas de Teotihuacán, Templo Mayor, Cholula y Chichén Itzá.

Bustoz, Dave [335] see Watkins, Christopher

Butler, Amanda (University of Illinois at Urbana-Champaign)

[299] *Moving a Movement: Missions and Missionaries in Medieval North America*

The relationship between cultural interaction and religion as a catalyst for long-term historical change is an underdeveloped line of inquiry in precolumbian archaeology. Particularly in North American archaeology, Mississippian cultural expansions and intrusions have been considered primarily in political or economic terms. Missionizing—defined as the intent to convert someone or something to a new idea or religion—in cultural and religious change may have facilitated the spread of a Mississippian religion from Cahokia, the only Native American city north of Mexico. The establishment and spread of a Cahokia-Mississippian religion can be seen as a religious movement differentially generated by many physical movements of persons, things, ideas, and substances. Archaeology is well suited to examine the fine-grained negotiation process of religious change. This paper focuses on one specific case study at the Collins site in East-Central Illinois and examines whether missionary practices were a catalyst for a religious movement.

Butler, Brian (Southern Illinois University)

[163] *Hopewellian Connections in the Midsouth: Tunacunnhee and Yearwood*

In 1976 Richard Jefferies published on a Middle Woodland burial mound complex in northwest Georgia called Tunacunnhee. The previous year, Brian Butler salvaged an unusual Middle Woodland ritual and mortuary site on the Elk River in southern Middle Tennessee, called Yearwood, published in summary fashion in 1979. At the time, radiocarbon dating was too limited and primitive to get an accurate read on the age of these two sites, and the then available dates suggested a considerable difference in age despite many similar artifacts with Hopewellian connections. A reexamination of the Yearwood data along with new radiocarbon dates now permits a better appreciation of the correct age of Yearwood and the potential relationships of these and other sites.

Butler, Michelle (University of California, Riverside)

[82] *Shifting Practices: Materiality and Mortuary Ritual at Early Classic Charco Redondo*

This paper explores the relationships between the people, objects and practices that created an Early Classic communal mortuary space at the site of Charco Redondo in the lower Rio Verde Valley of Oaxaca. The Early Classic follows the collapse of the first Rio Viejo polity, and significant differences in mortuary practices may signify a transformation in how power and authority were constituted. While communal internment continued, burials were generally undisturbed by later internments and individual offerings accompanied most burials as compared to communal caches and limited individual offerings in the Formative. Biodistance analyses also indicate that decedents were clustered according to phenotypic similarities. Entanglements between people, places, objects, and practices that engendered communal obligations and constrained strong social hierarchies in the Formative were being altered in ways that may have promoted individual and familial identities. The abundance of new materials used in mortuary ritual, such as Pachuca obsidian, likely also participated in the renegotiation of power and authority as more visibly hierarchical. The focus on individuals and dynasties is firmly established in the region by the Late Classic, a period that is in part defined by a rejuvenation of the Rio Viejo polity centered on elite rulership.

Butler, Michelle [82] see Joyce, Arthur

Butler, Virginia L. (Portland State University)

[228] *On the Ecodynamics of Fisheries at Tse-whit-zen*

On the northern Pacific Coast of North America, fish play an extremely important role in conceptual models related to hunter-gatherer evolution and social dynamics of household production and resource control. Our ability to rigorously apply archaeo-fish remains to these models is limited by substantial data requirements including well-documented contexts, high-resolution chronology, control over complex site formation processes and taphonomy, as well as large sample sizes. The 2004 excavation and careful geoarchaeological documentation of micro-stratigraphic contexts from Tse-whit-zen provides an opportunity to study fine-grained patterns in the fishery in the context of abrupt environmental change. Over 112,000 fish remains were documented, including ~57,000 specimens identified to at least order, from seven chronostratigraphic zones and associated with two plankhouses and extramural activity areas. Herring represent over 50% of the identified specimens, with 20+ taxa also present. While some variation in fish use is seen across social units and activity areas and through time, the main trend is stability. Given the fine-grain analysis, stability appears to be real, rather than an artifact of lumping multiple discrete occupations into large time blocks.

[150] *Discussant*

[228] *Chair*

Butrón, Ashuni E. Romero [44] see Tucker, Carrie

Button, Kerry [2] see Rosenthal, David

Buttress, Angela**[263]** *Abalone in the Archaeological Record of Barkley Sound*

This report focuses on the northern abalone (*Haliotis kamtschatkana*) recovered in the 2016 excavation of Hup'kisakuu7a (Site 93T) in Pacific Rim National Park. This study combines an analysis of the data recovered through archaeological excavation and column sampling at 93T, a review of neighboring archaeological site reports, and the collection and measurement of a modern assemblage of abalone shells. The aim was to answer three research questions: first, how ubiquitous is the presence of abalone in the archaeological record at 93T; second, how does the ubiquity of the abalone recovered at 93T compare to other sites in Barkley Sound; third, is it possible to estimate the size of archaeological abalone using a modern collection? It was determined that abalone is present in 5.6% of the levels examined at 93T, which represents the lowest ubiquity found among the six archaeological excavations reviewed. An assemblage of 22 modern abalone shells was used to create a regression model representing the relationship between hole measurements and total shell length with the intent of allowing researchers to estimate the total shell size of an abalone fragment found in the archaeological record. The strongest of these regressions can explain 59.45% of variability in shell length.

Buvit, Ian**[140]** *A Source and an End: Hokkaido, Sakhalin, and the Peopling of Beringia*

After nearly a century since confirming Pleistocene humans in North America, having taken a few misguided turns along the way, our discussions about First American origins remain focused on late glacial northeast Asia. While questions persist about exact timing and means, geographically, Beringia is central in terms of routes. Recent genetic literature describes a standstill or isolation when a series of distinct Native American lineages formed prior to movement south of the continental ice. While Beringia is a highly possible location for this event, we argue it was more likely the Paleo-Sakhalin-Hokkaido-Kuril (PSHK) Peninsula where geochronological evidence points to Last Glacial Maximum (LGM) refugia and where inhabitants produced a highly diverse suite of lithic tool kits. This was followed, however, by a period that coincides with the so-called standstill when nearly all PSHK sites produced only microblades. Moreover, the appearance of microblades in Eastern Beringia 14 ± 1 ka (and the end of the standstill) was coeval with their demise on the peninsula. We contend technological variability in the earliest American assemblages and the genetic standstill hypothesis is best explained with roots on PSHK.

[6] *Moderator***[253]** *Discussant*

Buvit, Ian [332] see Terry, Karisa

Buzon, Michele (Purdue University) and Sarah Schrader (University of Notre Dame)**[219]** *Comparison of Nubian and Egyptian Patterns of Physical Activity at New Kingdom Tombos*

Tombos, located at the Third Cataract of the Nile River in Sudan, was established as an Egyptian colonial site in Nubia during the New Kingdom period. Burials provide evidence for high level Egyptian administrators and support staff as well as local community members. Previous investigations of the Tombos remains have indicated that individuals buried at Tombos participated in relatively low levels of strenuous physical activities, indicative of roles such as administrators, scribes, and craftspeople. This study examines the differences in physical activities via enthesal remodeling and osteoarthritis in subgroups at Tombos. Strontium isotope analysis is used to differentiate locals from first generation immigrants, craniometric analyses are used to separate Egyptian and Nubian biological groups, and Egyptian/Nubian ethnic patterns are viewed via burial ritual. Though sample sizes are small, results indicate that Nubians may have been engaged in more strenuous manual labor than Egyptian individuals at Tombos. While most individuals in the overall Tombos population show few signs of hard labor, these results suggest that Egyptians may have participated in less physical roles, such as administrators, while Nubians had other tasks such as craft production.

Byerly, Ryan M. (Far Western Anthropological Research Group, Inc.)**[305]** *Chair*

Byerly, Ryan M. [152] see Lebovich, Liat

Byers, David [181] see Owens, Andrew

Byl, Sylvie [358] see Praet, Estelle

Byrd, Brian (Far Western) and Adrian Whitaker (Far Western)**[381]** *Did Increased Landscape Management through Pyrodiversity Lead to a Rise in Deer Procurement in the San Francisco Bay Area?*

Some of the earliest archaeological applications of human behavioral ecology were Central California studies of faunal resource depression by Jack Broughton including a detailed study of the massive Emeryville Shellmound, located on the east shore of San Francisco Bay. An intriguing pattern identified by Broughton was a significant increase in the relative abundance of deer in the later occupational strata at Emeryville. Broughton attributed this shift to the initiation of distant-patch hunting and supported this attribution with body part representation data. Recent research along the Central California coast at Quiroste Valley has highlighted the role of native Californians in maintaining a diverse and highly productive mélange of habitats through controlled burning. We seek to examine whether there is a faunal signature that provides evidence for similar burning in the San Francisco Bay Area and if so, whether this might provide a complementary explanation to Broughton's distant-patch foraging. We hypothesize that controlled burning of the hills adjacent to the Emeryville Shellmound would have enhanced habitat in a manner that increased deer populations and also made deer more regular targets for hunters from Emeryville. Finally, we discuss the broader implications of landscape management on prehistoric foraging in Central California.

Byrd, Brian [294] see Younie, Angela