

Taber, Emily C. (Portland State University) and Virginia L. Butler (Portland State University)**[194]** *Toward Developing an Economic Model of Fish Rank for Late Nineteenth-Century Pacific Northwest Households*

Considerable research has been conducted on archaeofaunal food remains as a proxy for consumer practices in Euro-American historical archaeology. Such research often incorporates price-driven meat rankings, in which the historical cost of a meat cut determines its rank. Archaeological fish remains also present an opportunity to examine how historical communities engaged with fish that could be acquired through subsistence practices, leisure activities, or market purchases. However, the social-economic rankings of fish have rarely been considered, even in the Pacific Northwest where fish were central to human lifeways. When fish remains are incorporated into rankings, they may be included only as one ranked item ('fish') and a single cut ('whole'), which fails to recognize the cultural and economic importance of fishes in historical Pacific Northwest communities, as well as the biodiversity of fishes that can vary greatly in size, abundance, seasonality, and so forth. This pilot study is part of a research effort to establish a price-driven meat ranking for Pacific Northwest fishes between 1880 and 1910. Pricing data for local fishes has been systematically collected from late nineteenth-early twentieth century newspapers, with prices averaged and adjusted to reflect stable rankings during the late Victorian era.

Tache, Karine (CUNY Queens College)**[319]** *Early Pottery and the Quest for Fat in Northeastern North America*

Accumulating evidence point toward hunter-gatherer communities as the first inventors of ceramic containers in many parts of the world, but the incentives behind this technological innovation remain elusive. In this presentation, archaeological information and biomolecular data from organic residues analyses are combined to support a scenario in which preagricultural communities in Northeastern North America used early pottery as a fat rendering device, whether the fat came from fish oil or bone grease. Rather than a sine qua non for extracting nutrients from specific resources, however, the invention of pottery is best understood as part of broader developments featuring seasonal gatherings and a new articulation of social relations.

Tacon, Paul [375] see Huntley, Jillian

Tafari, Aurelien (University of South Florida), Kewin Peche-Quilichini (University Montpellier 3) and Robert H. Tykot (University of South Florida)**[261]** *Typological and Archaeometrical (pXRF) Study of Final Bronze Age Ceramics of Cuccuruzzu, Corsica*

The construction of large stone fortresses, the casteddi, is a defining phenomenon of the Bronze Age period of the Mediterranean island of Corsica (France). However, the function and the precise chronological setting of these structures are still debated. The summer 2015 preventive intervention at the fortress of Cuccuruzzu has revealed some new information on the socioeconomic context of ceramic production during the Final Bronze Age (1200–850 BC). The typological study of the material indicated the existence of two distinct categories of ceramics, a fineware and a coarseware. In order to determine if these two types of ware corresponded to differential patterns of production and distribution, a portable X-ray fluorescence spectrometer (pXRF) was used to establish the chemical composition of sixty-seven artifacts and compare it with local clay sources. Multiple spots were analyzed on each sample, and multivariate statistics applied to trace elements Rb, Sr, Y, Zr and Nb. The results suggest that while most of the coarseware sherds had a similar chemical composition and were presumably manufactured with local clay, a large proportion of the fineware was made with imported or unusual raw material.

Taffere, Abebe (University of Florida)**[55]** *Terminal Pleistocene Lithic Technology and Adaptation from Bulbula River B1s4 Site, Ziway-Shala Basin, Ethiopia*

Archaeological excavation which had been conducted in 2009 and 2010 in the Ziway-Shala Basin, close to the Bulbula River Canyon at B1s4 site, has yielded lithic assemblages and few faunal remains. Two human occupation horizons (PS1 and PS2) were identified which are separated by an occupational hiatus at the very end of the terminal Pleistocene. Analysis of debitage on both unit levels indicates the presence of similar features that lead us to assume that B1s4 lithic industry was oriented toward the production of blades and bladelets. But, this site shows strong technological and industrial variabilities to early Holocene sites which are very close to B1s4. The microliths, which are widely discovered at early Holocene sites and to a lesser extent sites dated to Pre-Glacial Maximum, are hard to find at B1s4. Alike Paleoenvironmental records in the Ziway-Shala basin and other parts of Ethiopia and Eastern Africa, B1s4 has proved that terminal Pleistocene was characterized by fluctuating weathering conditions that might have forced hunter-gatherers in the region to practice diverse adaptive strategies.

Taffere, Abebe [171] see Brandt, Steven

Takahashi, Ryuzaburo (Waseda University, Tokyo)**[211]** *A Consideration of Totemism in Late-Latest Jomon Age Based upon Archaeological Records*

Recent advance in anthropology have resurrected the term totemism from earlier theories developed by such scholars as Robertson Smith and E. Durkheim at the beginning of twentieth century. The crucial features of totemism are: 1) it represents total emblems of the descent groups; 2) it functions to support solidarity of the group; 3) it has as exogamic function; 4) it invokes taboos against killing certain animals and eating them; 5) it constitutes intimate relationships between human being and specific animals and plants; and 6) It strengthens the special bond human groups and their ancestors by means of ceremonial feasts and rituals. From an archaeological perspective, some elements of totemism are present in the Late to Latest Jomon age culture in Japan, including evidence of zoomorphic clay figures and ceremonial feasts and rites, animal sacrifice, polite attitude for special animals, identification animals for human. Those features were diagnostic in northern Japan in Late Jomon age.

Taivalkoski, Ariel [257] see Howard, Joshua

Takahashi, Tomonari [330] see Tsutaya, Takumi

Takamiya, Hiroto (Kagoshima University)**[180]** *The Colonization of the Southern Ryukyu Islands, Japan*

The Ryukyu Islands are located in the western Pacific between the islands of Kyushu and Taiwan, stretching approximately 1,200 km. The focus of this presentation is the Southern Ryukyus islands, which consist of the Miyako and Yaeyama archipelagos. Until recently, the Miyako Island was the only island in this region which yielded fossil human remains dating to the late Pleistocene. Recently, human fossil remains dating to the same period has been unearthed from the Yaeyama islands. During this period, these islands were not connected to the mainland of Taiwan or China, indicating they

crossed water gaps at this stage. This presentation first introduces these late Pleistocene data, and then examines the Holocene colonization processes. While it has been not well understood, many scholars believe the first colonization to the area took place not from the north (from the Okinawa archipelago) but somewhere from the south such as Taiwan and/or Philippines. Furthermore, there seems to have been another colonization to the islands at the beginning of the Gusuku period. This time, the colonizers appear to have come from the north.

[24] *Discussant*

Takaoka, Ian (Northern Kentucky University) and Sharyn Jones (Northern Kentucky University)

[374] *Nukubulavu: An Examination of Fijian Mid-Sequence Ceramics on Vanua Levu, Fiji*

This paper reports on excavations from field seasons in 2013 and 2014 when major excavations on the main landmass of Vanua Levu, Fiji were conducted at the beach site of Nukubulavu. This site is positioned on a small peninsula in the island's southeastern Natewa Bay region. Nukubulavu produced ceramic assemblages that extend to all of Fiji's known culture history. The team also documented a deeply buried probable house floor with diagnostic artifacts that indicate intensive occupation during Fiji's Mid-Sequence (ca. 2800 BP–500 BP). The assemblage includes Late Lapita rim fragments with dentate stamping, body sherds and rims of large Fijian Plainware vessels, and fragments from the Navatu phase. With such a diverse representation of Fijian material culture and approximate dates via Radiocarbon AMS, Nukubulavu presents a rare opportunity to inspect in detail changes that may have occurred between the Plainware and Navatu phases of the Fijian Mid-Sequence. A detailed examination of the assemblage is underway, which will help to determine if stratigraphic variations, corresponding with our Radiocarbon AMS dates and Bayesian models, demonstrate clear correlations with the distribution of ceramic types.

Takigami, Mai (Yamagata University), Fuyuki Tokanai (Yamagata University) and Minoru Yoneda (University of Tokyo)

[358] *High C4 Plants Consumption from the Late Intermediate Period in the Cuzco Region*

Maize was one of the important crops for Inca political economics as a ritual and a staple food. In previous study of sacrificed children mummies found at Mt. Llullaillaco, the individuals particularly consumed C4 resources (such as maize, amaranth and domestic animals raised with C4 plants) in ritual activities. Contrary, the dietary compositions of Machu Picchu skeletons have shown diversity. The individuals from Mt. Llullaillaco and Machu Picchu were most probably immigrated from different regions and may not represent the diets in the capital city of Inca. Therefore, it is important to reveal inherent diet of the Inca group which had been emerged in Cuzco region to get better understanding of their maize usages in their economy. We conducted dietary investigation on the five sites of Cuzco region using carbon and nitrogen isotope ratios. Our data revealed that high C4 resource consumption started by the Late Intermediate period. Meanwhile, nitrogen isotope ratios of Sacsayhuaman in Cuzco city were the highest. Estimation of marine resource consumption using ^{14}C date suggested that their high nitrogen isotope values were derived from C4 plants. Inca may have had an agricultural system using guano as the fertilizer or putting a priority on the amaranth cultivation.

Takigami, Mai [238] see Uzawa, Kazuhiro

Talaverano Sanchez, Arlen Mildred (Universidad Nacional Mayor de San Marcos), William McCollum (Vanderbilt University) and Steven A. Wernke (Vanderbilt University)

[75] *Uso de un espacio sagrado: Excavaciones de la sacristía de una reducción colonial en la Sierra sur del Perú*

Los espacios rituales han sido desde siempre lugares importantes dentro de las comunidades humanas pues son la expresión material de sus creencias y su fe. En el caso del Virreinato del Perú, la invasión española del siglo XVI significó un cambio radical en la concepción y materialización de la religiosidad practicada, donde la construcción de edificios de carácter religioso encarnó el cambio de vida y costumbres de los pueblos conquistados. Esta ponencia explora el espacio arquitectónico de la sacristía ubicada en la reducción de Santa Cruz de Tute, en el valle del Colca, Arequipa. Las excavaciones realizadas dentro del Proyecto Arqueológico Tuti Antiguo durante la temporada 2016 han permitido distinguir los diferentes usos de este recinto y su transición hacia un espacio sagrado y de culto. Una serie de remodelaciones arquitectónicas, la presencia de objetos de culto y contextos funerarios de infantes, señalan el uso variado de este espacio para el desarrollo de actividades rituales durante su ocupación y su posterior abandono. Estos indicadores nos dan luces sobre la vida religiosa en las reducciones durante la Colonia y nos permiten entender la relación que la población de entonces mantenía con estos espacios sagrados.

Talcott, Susan, Jelmer Eerkens (University of California, Davis) and Eric Bartelink (California State University, Chico)

[381] *Modeling the Relationship between Riverine Resource Exploitation, Technology, and Social Organization in the Sacramento River Basin*

Isotopic studies allow for a more refined look at variation in diet and mobility among individuals. These studies have been used in California as a proxy for analyzing human behavioral adaptations. In this study we use stable isotope analyses of human bone collagen and apatite to evaluate diet of individuals from sites within the Sacramento River basin over time. Ethnographic accounts from this area emphasize the importance of mass salmon procurement and describe high levels of social organization, trade, storage, and specialized fishing and preservation technologies. However, archaeofaunal assemblages from this region often lack evidence of intense salmon exploitation, limiting knowledge of the time depth of these practices. For this study, we examine specific dietary indicators of riverine versus marine protein resource exploitation and use this to model the relationship between diet, technology, and social organization through time. Site location and chronological context are used as proxies for technological constraints and population size.

Tallarico, Vanessa [263] see Cowan, Maya

Tallavaara, Miikka [227] see Pesonen, Petro

Tang, Jigen [72] see Liu, Yu

Tankersley, Kenneth (University of Cincinnati)

[249] *Removal of Coal Contaminants from Chaco Canyon Radiocarbon Samples*

Micro-flotation, a specific gravity separation technique, was successfully used to remove coal contaminants from radiocarbon samples obtained from profiles, unit excavations, and solid sediment cores in Chaco Canyon, New Mexico. Coal from the Cretaceous Menefee Formation occurs throughout Chaco Canyon in aeolian, alluvial, colluvial, and anthropogenic sediments. The Menefee Formation contains carbonized broadleaf angiosperm and gymnosperm plants and, as such, paleobotanical analysis was not effective in the identification and removal of coal contaminants. The effectiveness of micro-flotation as a pretreatment procedure was evaluated by 1) comparing AMS radiocarbon ages on processed and unprocessed samples from the

same archaeological contexts; 2) comparing a processed sample of carbonized hardwood charcoal with a sample of uncarbonized hardwood from the same archaeological context; and 3) comparing radiocarbon ages on a split sample of processed bulk carbon. The comparisons confirmed the effectiveness of micro-flotation in processing samples for radiocarbon dating in Chaco Canyon and would be applicable for similar locations elsewhere in the world.

[249] Chair

Tantaleán, Henry (Cotsen Institute of Archaeology, UCLA), Alexis Rodríguez Yábar (Universidad Nacional Mayor de San Marcos), Kelita Pérez Cubas (Pontificia Universidad Católica del Perú) and Charles Stanish (University of California, Los Angeles)

[308] *The Pinta Ceramic Phase: Explaining a Paracas Ceramic Phase from Cerro del Gentil*

During the last five years, we have developed an archaeological research program in the southern Peruvian coastal valley of Chíncha. This project focuses on the rise of the Paracas society ca. 800–200 BCE. We excavated the monumental Paracas site of Cerro del Gentil located in the Chíncha mid-valley where we recovered an important ritual context in a sunken court related to the Pinta phase. The Pinta phase was defined by Dwight Wallace in 1950's but not has been systematically described. In this paper, we describe the Pinta assemblage and contextualize it in a regional context of Paracas emergence.

Tanudirjo, Daud A. [302] see Reepmeyer, Christian

Tappan, Katie [7] see Wisner, Gavin

Tapper, Bryn [52] see Deal, Michael

Tarkanian, Michael (MIT) and Elizabeth H. Paris (University of Calgary)

[164] *An Evaluation of Stingless Bee Wax as a Pattern Material in Mesoamerican Investment Casting*

Mesoamerican metal objects have been studied in-depth in terms of alloys and production techniques, but little work has been carried out on the foundry materials used in the prehispanic casting process. In modern foundry practice, synthetic waxes, paraffins, or processed European honeybee wax (from the *Apis* genus) are commonly used as pattern materials. One possible ancient Mesoamerican pattern material is the wax of the stingless bee *Melipona beecheii*, a species known to be cultivated by the Maya. Ethnohistorical sources attest to the widespread practice of meliponiculture in prehispanic Mesoamerica at Spanish contact. Meliponiculture was particularly common in Northern Yucatán where its products, honey and beeswax, were commonly exchanged as commodities, and were staple products used to pay provincial taxes. Archaeological evidence, including metallurgical ceramics and production debris, suggests that lost-wax casting formed an important component of Postclassic period Maya metallurgical technologies at the urban centers of Mayapán and Lamanai. This paper examines the efficacy of stingless bee waxes as a foundry wax, particularly as a component of the copal-wax mixture described in the Florentine Codex. The thermal, mechanical, and rheological properties of these waxes and blends will be evaluated in order to assess their use in a foundry context.

Tarle, Lia (Simon Fraser University), George Nicholas (Simon Fraser University) and Hugo Cardoso (Simon Fraser University)

[193] *Museum Ethics and the Display of Archaeological Human Remains*

Museums display archaeological human remains to educate visitors about past people's lives, beliefs, and customs, and to encourage reflection. However, over the past fifty years, political changes, including civil rights, decolonization, and repatriation movements, have driven some museum professionals and academics to reevaluate the authority of museums and their ethics. These developments have inspired discussions about the ethical treatment of both Indigenous and non-Indigenous human remains, which are now reflected in professional guidelines and accords emphasizing 'respect.' The display of Indigenous human remains is usually considered unethical. However, when it comes to other institutionalized human remains, the definition of 'respect' is unclear. A number of museum professionals have experimented with methods of displaying non-Indigenous archaeological human remains with respect. They attempt to tackle this ethical issue and create public dialogue by displaying remains in new ways, or by removing existing displays. This presentation will review recent developments in museum ethics pertaining to the treatment of human remains, with a focus on novel approaches to displaying archaeological human remains. It will highlight public and professional reactions to such displays, and discuss what may be learned from these examples about ethical display practices for the future.

Tarquino, Daniella (Quinnipiac University), Gerald Conlogue (Bioanthropology Research Institute, Quinnipiac Uni), Jaime Ullinger (Department of Sociology, Criminal Justice, and Ant) and Ramon Gonzalez (Radiology Assistant Program, Quinnipiac University)

[151] *Confirmation of an Osteological Feature, Diploic Veins, via Three Imaging Modalities*

Skeletons from site Tell el-Hesi (ca. 1400–1800 CE; located in the southern Levant) have been undergoing renewed paleopathological analysis with the use of nondestructive imaging techniques. Upon assessing for pathology a computed radiograph image revealed multiple thin radiolucent structures within the cranial fragments of an individual that were not observed on the surface of the bone. These canal-like structures, thought to be some type of nutrient vessel, required further analysis to substantiate the finding. Three imaging modalities; multi-detector computed tomography (MDCT), fluoroscopy and additional CR images, were utilized in order to confirm the osteological feature. Curvilinear reconstructions from the MDCT data revealed the canals traveled continuously through the diploë of the skull. A copper beading wire was passed through the canals and CR images were obtained. A micro-introducer accessory guidewire was advanced further under fluoroscopy and both methods revealed the radiopaque wire path matched the pattern noted on the MDCT image. The characteristics of these structures matched best with the skeletal alterations due to diploic veins, a normal anatomical feature. The patterns left behind by these veins can provide insight into the soft tissues of the body, information on the population, as well as phylogeny and forensic anthropology.

Tasa, Guy (WA Department of Archaeology and Historic Preservation)

[361] Moderator

Taylor, Amanda (Pacific Lutheran University)

[79] *Lithic Landscapes and Mobility from the Great Basin to the Salish Sea*

Beck and Jones' approach to settlement patterns is useful beyond the small highly mobile groups of the Great Basin Paleoarchaic because they expertly model how to connect lithic artifacts with the lithic landscape: first, conduct a thorough investigation of toolstone sources; second, consider how people brought toolstone to sites and how that might be reflected in the reduction sequence; and third, examine the representation of the reduction sequence at

many sites across the landscape. I have been greatly influenced by this approach in my investigation of the mobility patterns of semi-sedentary late Holocene groups on the San Juan Islands, Washington. Settlement patterns here are complicated by boat travel and territoriality, but the analysis of lithic procurement, transport, and reduction still provides a useful perspective on where Coast Salish family groups moved over land and water. This research involves beach cobble surveys, analysis of transport costs, and beach cobble reduction analysis. I also consider Beck and Jones' concept of parallel shifts between climate change, settlement patterns, and lithic procurement in a Salish Sea context.

Taylor, Christopher [9] see McKee, Brian

Taylor, Geoffrey (UC Berkeley)

[19] *Identity Intersectionality and Gender in the Archaeological Past and the Archaeologists' Present*

Archaeologists live in a reality in which gender, sexuality, race, age, and occupational identities (to name a few) are pervasive and impactful in our professional and personal lives. Our individual experiences in the world are always being shaped by our place at the intersection of multiple perceived and/or performed identities in the multiple social landscapes we inhabit. It then must be accepted that social identities operated similarly for people in the past. Still, there remains a hesitance among many archaeologists to investigate the full intersection of social identities in their own work. Further, some refuse to acknowledge that some gender can be studied at all in archaeological research. At one level, this paper will review prior literature on gender and identity to propose the incorporation of previously successful methods and interpretive frameworks that may allow identity intersectionality to be incorporated into more archaeological studies. At another level, this paper will critically examine how the intellectual and social landscape among academic archaeologists has been constructed to uphold social and intellectual divisions that, in effect, enabled in the push of gender archaeology to the periphery of the field.

Taylor, William (University of New Mexico)

[114] *Equine Dentistry and Early Horse Husbandry in the Mongolian Steppe*

Although nomadic horse pastoralism remains an important way of life in eastern Central Asia, the origins of horse herding in the region and their relationship to key social developments are poorly understood. Recent work indicates that late Bronze Age people of Mongolia's Deer Stone—Khirigsuur (DSK) Complex herded horses, and used some of them for transport by circa 1200 BCE. This paper presents evidence that DSK people practiced equine dentistry and veterinary care, removing or modifying incisors that may have interfered with feeding. Results indicate a sophisticated knowledge of equine anatomy and behavior during the late Bronze Age, which would have contributed to the success of nomadic societies in Mongolia during the first millennium BCE.

[114] *Chair*

Taylor, William [114] see Fantoni, Marcello

Teeter, Wendy G. (Fowler Museum at UCLA)

[363] *Moderator*

[63] *Discussant*

Teeter, Wendy G. [189] see Hanson, Eric

Teixeira-Santos, Isabel [143] see Reinhard, Karl

Tejerina, Maria Elena [222] see Albeck, María

Tejero, José-Miguel (CNRS [French National Center for Scientific Research], SERP Barcelona University), Reuven Yeshurun (Zinman Institute of Archaeology, University of Hai), Omry Barzilai (Israel Antiquities Authority, POB 586, Jerusalem), Israel Hershkovitz (Tel-Aviv University [Israel]) and Ofer Marder (Department of Bible, Archaeology and Ancient Near)

[338] *Toward Complexity in the Osseous Raw Material Work at the Beginning of the Early Upper Paleolithic in Eurasia: The Manot Cave (Israel) Osseous Tools in the Aurignacian Emergence and Diffusion Context*

The Early Upper Paleolithic in the Levant plays an important role in understanding the emergence, dispersal, and adaptations of the first anatomically modern human populations in Eurasia. The exploitation of osseous raw materials for technical and conceptual behaviors is recognized as one of the several innovations that have occurred both in the Levant and in Europe during this time. Previous works demonstrated that the complex and innovative working of osseous materials in Europe is restricted to antler working, around 40 Ka cal BP, and are thus chronologically coincident with the emergence of the Early Aurignacian. Conversely, bone exploitation shows a continuity through the Mousterian, the Proto-Aurignacian and the Early Aurignacian, invalidating the argument that osseous material exploitation represents a radical difference between the Middle and Upper Paleolithic in Europe. We present the results of a technological analysis on the bone/antler industries from the EUP (Aurignacian) layers at Manot Cave, Israel. Comparing the technical concepts of the bone/antler working, through the operational sequence, between the European and the Levantine Aurignacian allow us to discuss the significance of the osseous raw material exploitation in the framework of the different proposed hypotheses on the emergence/diffusion of the Aurignacian techno-typological tradition over Eurasia.

Telepak, Justin [243] see Guderjan, Thomas Harold

Téllez, Miguel [142] see Fonseca Ibarra, Enah Montserrat

ten Bruggencate, Rachel (University of Waterloo), S. Brooke Milne (University of Manitoba), Mostafa Fayek (University of Manitoba), Robert Park (University of Waterloo) and Douglas Stenton (Government of Nunavut)

[22] *Establishing Provenance for Chert from Southern Baffin Island: a Multi-Scalar Approach*

Difficulties in physically or chemically distinguishing between chert from closely situated quarries have made a multi-scalar approach to chert provenance analysis necessary in some regions. We present the preliminary results of a multi-scalar chert provenance project focused on the eastern Canadian Arctic. On a regional scale, we examine ICP-MS trace element results for chert from two quarries and five archaeological sites on southern Baffin Island. Chert from the quarries and archaeological sites is chemically similar. However, provenance assignments based on these data alone must be viewed as highly provisional, given that the chemical signature of the materials analyzed may be representative of chert deposits throughout the eastern Arctic. We augment these data with ICP-MS trace element results for chert quarry and artifact samples from the Churchill region of the west coast of Hudson Bay, which diverge significantly from those of the Baffin Island quarries. These results support placing the Baffin Island quarries into a regional quarry group to which provenance for the Baffin Island archaeological material can be more confidently assigned.

Tennie, Claudio [38] see Lin, Sam

Terlep, Michael L., Travis Bugg (Logan Simpson, Inc.), Erick Laurila (Logan Simpson, Inc.) and Francis E. Smiley (Northern Arizona University)

[301] *Covering Ground: Spatial Relationships of Prehistoric Sites on Black Mesa, Arizona*

Modern applications in spatial analysis are reinventing the way archaeologists view spatial relationships in the prehistoric Southwest. Building on the extensive research conducted by the Black Mesa Archaeological Project (BMAP), this poster presentation presents new insights into spatial relationships and social dynamics on northern Black Mesa, Arizona using ArcGIS applications, such as viewshed analysis, as well as predictive modeling. Recently conducted pedestrian survey on Peabody Western Coal lease areas on Navajo and Hopi tribal lands provide spatially accurate data to address lingering questions within Black Mesa archaeology, such as the relationships between primary and secondary Ancestral Puebloan habitation complexes.

Terlep, Michael L. [140] see Bryce, William

Terry, Karisa (Central Washington University), Ian Buvit (Central Washington University/ National Parks Service) and Aleksander V. Konstantinov (Chita State Pedagogical University)

[332] *Late Pleistocene Campsites of the Transbaikal, Siberia*

Late Pleistocene settlement systems in the Transbaikal Region of Siberia were established by 21,000 cal BP, and underwent key changes as climates ameliorated into the Holocene by around 12,000 cal BP. During this time the area was characterized by construction of characteristic stone-outlined circular structures, or dwelling features, with activities situated around central, stone-outlined hearths, in riparian environments of major waterways. A few produced as many as six hearth features. With warming climates and increasing forests, inhabitants diversified and intensified their consumption of small mammals, birds and fish, aided by emerging technologies including bone harpoons and possibly ceramics. We explore the developmental variability of these unique structures along the Menza and Chikoi Rivers in the southwestern Transbaikal. Several key sites such as Studenoe and Ust'-Menza where complexes of remarkable late Pleistocene dwellings are highlighted emphasizing numerical chronology, formation processes, and associated artifact assemblages.

Terry, Richard [71] see McNeil, Cameron L.

Terwilliger, Valery (University of Kansas), Marilyn Fogel (University of California, Riverside, USA), Paul Adderley (University of Stirling, UK), Zewdu Eshetu (Addis Ababa University, Ethiopia) and A. Catherine D'Andrea (Simon Fraser University, Canada)

[171] *Learning from Scratch What the Environments Were Like as the Complexities of Societies Changed in Eastern Tigris*

Home to Aksum and other highly-developed polities, the Tigris Plateau is a leading contender for sub-Saharan Africa's richest center of ancient state formation. This and its susceptibility to environmental (climate and land cover) variation make the region compelling for evaluating whether environmental changes affected the trajectories of polities. Soils exposed by gullying are the longest continuous archives of environmental proxies in the region. Many proxies are affected by both climate and land cover. Results indicate that stable hydrogen isotopic ($\delta^2\text{H}$) analyses of specific land-plant derived n-alkanoic acid (n-alk) molecules in soil organic matter are most affected by precipitation. Furthermore, the rainfall inferences from $\delta^2\text{H}$ n-alk values can clarify whether changes in other proxies were due to climate or land cover. Our isotopic, elemental, and micromorphological analyses of gully soils suggest that Pre-Aksumite and Aksumite polities emerged during wetter intervals but that anthropogenic influences on land cover may have been very different during each period. Our present challenge is to understand possible relationships between the complexity of settlements and their immediate environments. To meet this challenge, we are building local records of environmental change and coupling them to the emerging archaeological record of settlement characteristics in Mezber and Ona Adi.

Terwilliger, Valery [171] see Adderley, Paul

Tessone, Augusto [284] see Zangrando, Atilio

Testard, Juliette (Paris 1/UMR 8096 Archéologie des Amériques)

[369] *Mesoamerican Figurative Plaques: Elites' Legitimization Strategies during the Epiclassic Period (AD 600 to 900)*

Few authors have analyzed figurative plaques from Late Classic and Epiclassic contexts even though they are considered as prestigious artifacts and exhibited as prominent pieces in Museum collections all around the world. Several examples from Epiclassic city states of Cacaxtla-Xochitecatl (Tlaxcala) and Xochicalco (Morelos) will be analyzed. Contexts, morphologies and iconographies reveal continuities of sociopolitical and religious practices with contemporaneous Maya sites. We will propose hypotheses concerning the manufacturing, circulation and functions of these peculiar artifacts. They highlight political strategies of legitimization in which elites are represented as mediators between different beings both human and nonhuman.

Teufer, Mike

[221] *The Bronze and Iron Age Sites Saridjar and Karim Berdy, Tajikistan*

The Late Bronze Age site of Saridjar was discovered during a survey of the northern Yakhsu valley in 2010. Excavations in 2012, in 2013, 2015 and in 2016 prove that we are dealing with a 200 × 200 m large settlement with at least three construction phases. The proportion of the hand-made ceramics

in all levels varies between 80% and 90%. Only occasionally wheel-made ware appears. Andronovo pottery of the Federovo phase is present in small numbers. At Karimberdy nearly all the pottery was handmade. The continuity is obvious not only in the production process but also in terms of typological development of pottery forms: small bowls with S-shaped rim are abundant at Saridzhar, and they continue in painted handmade ware in the Yaz I period of Karimberdy. Therefore Saridzhar is a transitional site between the Late Bronze Age and the Early Iron Age (Yaz I-period).

Thacker, Paul (Wake Forest University)

[389] *The Importance of Short Duration Archaeological Sites for Contextualizing Forager Organization: An Argument from the Middle and Upper Paleolithic of Central Portugal*

The majority of Late Pleistocene archaeological sites in central Portugal resulted from short-term forager activities on the scale of days or weeks. This paper explores the analytical and theoretical significance of these small, ephemeral sites for understanding Middle and Upper Paleolithic organization of technology and settlement strategies. The interpretive context provided by short term site assemblages is essential for developing robust regional hypotheses of Paleolithic behavior, including the local scale of MP raw material selection, a complex Gravettian settlement strategy for the Rio Maior region, and increasingly reliable and standardized technological organization during the Magdalenian. The variability in formation processes at different activity duration scales is an often neglected line of evidence for evaluating anthropological models of prehistoric forager adaptations, an oversight that creates a large-site bias and frequently leads to erroneous archaeological conclusions.

Thakar, Heather (Texas A&M University)

[2] *Finding our Way Forward: Collections Management in a Changing World*

Confronting the existing challenges of archaeological collections management amid increasing threat from environmental disasters Museums, Curation facilities, and Repositories worldwide are struggling to preserve irreplaceable cultural heritage. At the same time researchers and government agencies are also struggling to mitigate loss of valuable cultural heritage threatened outside of existing facilities. All involved clearly want to increase opportunities to learn valuable lessons and collect new data from material remains of the human past. This paper considers opportunities for researchers, government agencies, and museum professionals to develop new strategies to preserve the research, education, and outreach value of archaeological materials already in collections as well as new materials being excavated from threatened sites.

[291] *Discussant*

[2] *Chair*

Tharalson, Kirsten (University of Iowa) and Matthew E. Hill Jr. (University of Iowa)

[344] *Bison, Dog, and Deer, Oh My! Faunal Analysis of the Lovitt Site, Western Nebraska*

The Dismal River complex is a protohistoric archaeological complex likely representing an early Apache occupation on the Central Great Plains of North America. A key Dismal River complex site is the Lovitt site (25CH1), located in southwestern Nebraska. Excavations at Lovitt in 1939 revealed the site as a small residential locality with three ephemeral house structures and more than 150 pit features. Recent radiocarbon dating at the site suggests it was likely occupied either in the first half of AD 1500s or during the middle of AD 1600s. This study analyzes the faunal material from the site. Our study focuses on reconstructing prey choice decisions and patterns in carcass utilization. Finally, we compare our results from Lovitt to patterns of faunal use at other Dismal River sites in order to better understand early Apachean subsistence practices.

Therrien, Monika (Director)

[327] *Satisfying Needs and Negotiating Freedom in Colonial Spanish American Cities*

Unlike archaeological studies that seek to focus on the relations of power and elites, that by means of physical violence and symbolic exerted their domination over other groups assumed to be passive, an approach from practice theories and spaces of contact in which daily practices took place is proposed. It is in these spaces and through everyday activities that curiosity, knowledge and consent made it possible for the majority to survive under the colonial regime, without this implying an unconscious submission. With this purpose two spaces of practices are examined, 1) the production of ceramics, in which techniques and ways of doing converged with new decorative styles and forms, that made artisans with different historical and geographical backgrounds aware of the conditions of life imposed on them, and 2) the shops and market places, where the ceramic wares acquired various uses and meanings, both between natives and settlers. The crafts and trades exercised by artisans and merchants as they satisfied domestic and daily needs lead them also to find a place in colonial society, which, by being considered exclusionary and repressive, these groups and their practices have been made invisible in the studies of power.

Therrien, Monika [36] see Cohen, David

Theuer, Jason [273] see Freeman, Jeremy

Thibodeau, Alyson [23] see Hedquist, Saul

Thies, Meagan (Illinois State University)

[109] *Moderator*

Thomas, Andrea (Center for Archaeological Research, University of Texas at San Antonio)

[368] *The Evaluation of the Labor Costs of Stone Boiling Dried Maize during the Early Agricultural Period in the Southwest*

The Early Agricultural period (2100 BC–AD150–500) in the Southwest begins with the presence of maize and ends with the advent of ceramic vessel use. It is assumed maize was dried out and stored for future consumption. Once dried, maize required extensive processing to gelatinize the endosperm starch, or transform the polysaccharides back to a digestible monosaccharide, through techniques such as: parching, steeping, grinding, and/or boiling (Hard et al. 1996). Little, however, is known about the exact methods of dried maize processing during the Early Agricultural period. The addition of slaked lime to cook dried maize in boiling water, or nixtamalization, can boost digestive breakdown and the nutritional availability of the maize (Katz et al. 1974). Some Southwest archaeologists postulate nixtamalization could be achieved with an indirect firing technique termed “stone boiling” (Ellwood et al. 2013). This poster presents the results of seven stone boiling dried maize experiments. This research addressed the following questions: what are the labor costs of stone boiling dried maize and would this technique be a viable approach for daily consumption? These experiments demonstrated that the labor costs of stone boiling dried maize would be too high to be a preferred processing technique by early maize agriculturalists.

Thomas, Andrea [303] see Roney, John

Thomas, Colin

[164] *Imperial Authority and Local Agency: Investigating the Interplay of Disruptive Technology, Indirect Authority, and Changing Ritual Practice at Dos Cruces*

The Chimu smelting site of Dos Cruces is located along the Zaña River in the middle valley of the greater Lambayeque area. Dos Cruces is located at the intersection of two major trade routes and nearby several rich sources of copper ore. The smelting of ore at Dos Cruces utilized wind powered smelting technology, a new innovation for this region. Despite its obvious Chimu affiliations, Dos Cruces lacks an *audiencia*, or indeed any indication of Chimu administrative oversight. The denizens of Dos Cruces appear to have engaged in a campaign of site fortification unique among known Chimu crafting centers, restricting access even among the residents themselves. The ritual behavior at Dos Cruces is also distinct both from other Chimu crafting sites and other Andean smelting sites, featuring the ritual killing and burial of furnaces and the rebuilding of the entire smelting terrace at least three times over the life of the site. This paper investigates the nebulous relationship between Imperial power and local agency at Dos Cruces in the context of indirect imperial authority as well as the role of wind powered smelting in the formation of new economic and ritual understandings of copper smelting.

Thomas, David (American Museum of Nat History)

[376] *Great Basin Incised Stones and the Shoshonean World*

More than 1,500 incised stones have been documented from the Great Basin. By defining object itineraries of individual artifacts, it is possible to animate the archaeology from static to active by emphasizing motion and interaction, fragmentation and accumulation. Tracing both provenience and provenance, we can learn how these objects moved through time and space, intertwining with people and places. It is possible to craft a cartography sufficiently powerful to tease out an underlying, basic, formal structuring of ritual behavior that has epitomized Shoshonean epistemology for more than five thousand years.

[376] *Chair*

Thomas, Jayne-Leigh (Indiana University)

[63] *Discussant*

Thomas, Julian (Manchester University)

[81] *Discussant*

Thomas, Suzie

[150] *Discussant*

Thomin, Mike

[43] *Archaeologyin3 Minutes: Multimedia Storytelling in Public Archaeology*

In 2014 the Florida Public Archaeology Network began producing a webisode series titled "Archaeologyin3 Minutes." These three-minute videos are designed to highlight archaeology in the state of Florida and feature the research of faculty and students at the University of West Florida. In 2015 one of these videos was awarded First Place Winner and People's Choice Award for the Video Category in the Archaeological Photo and Video Festival Competition hosted by the Society of Historical Archaeology in Seattle, Washington. The overall goal of this project is to educate the public about the archaeological process and communicate the importance of preservation and protection of cultural resources through multimedia storytelling. Video has long been used a medium to present archaeology to the public. The digital revolution and availability of less expensive high-quality digital equipment, however, have empowered anyone to tell their own stories and reach much wider audiences than previously. This paper offers some lessons learned from the field for creating digital videos that present archaeology to the public, and covers a wide range of multimedia storytelling, from basic equipment needed to how to best conduct interviews with subjects.

Thompson, Amy (University of New Mexico)

[162] *Settlement Development and Social Landscapes at the Classic Period Maya center Uxbenká*

Using a Human Behavioral Ecology (HBE) framework, the social and environmental factors that influenced community development have been modeled at Uxbenká, a Classic period Maya center located in the southern foothills of the Maya Mountains. This study focuses on settlement decision making dynamics using a chronological assessment of the expansion of settlements based on radiocarbon dating and ceramic typologies in conjunction with statistical analyses to test which factors influenced patch selection of early colonizers of the Uxbenká landscape. We found that over time the social construction of the community shifted from an Ideal Free Distribution, where individuals had free-choice of where they settled, to an Ideal Despotic Distribution, in which despotic elites' influenced settlement choice of hinterland residents.

[162] *Chair*

Thompson, Ashleigh (University of Arizona) and Anna Jansson (University of Arizona)

[344] *The Integrity of a Surface Collection and Its Value to a Tribe*

What is the value of a large surface collection? Surface finds are often dismissed by archaeologists as having little or no integrity. Our work uses data from 24GL304 (The Billy Big Spring Site) to speak to two different types of value for a surface collection: one being its archaeological integrity and the other the value placed on these artifacts by their descendant community. During modern times, the area around our study site has been used as rangeland, which has resulted in animal trampling causing the disturbance of the near-surface deposits. Three research questions guide our work: 1) What has been disturbed? 2) Is there any primary depositional patterning preserved among the surface artifacts? We use GIS analysis to calculate patterning among the artifacts. 3) What do the surface finds from this site mean to the Blackfeet community and tribal members who were involved in this project? Through ethnographic interview, we ask how this project interacts with the Blackfeet identity, their history, and their connection to the land. By following these research questions, we attempt to speak to value of the surface finds at our study site, as both a resource for archaeological data and as a monument to tribal identity.

Thompson, Jessica (Emory University), Alan Morris (University of Cape Town), Flora Schilt (University of Tuebingen), Andrew Zipkin (University of Illinois at Urbana-Champaign) and Kendra Sirak (Emory University)

[146] *The Forgotten Significance of the Later Stone Age Sites near Hora Mountain, Mzimba District, Malawi*

In 1950, J. Desmond Clark led excavations at a Later Stone Age rockshelter at Hora Mountain, a large inselberg overlooking a modern floodplain in the Mzimba District of northern Malawi. At the Hora 1 site, he recovered two human skeletons, one male and one female, along with a rich—but superficially described and undated—cultural sequence. In 2016, our renewed excavations recovered a wealth of lithic, faunal, and other materials such as mollusk shell beads and ochre. Our reexamination of the skeletons also produced the first ancient DNA from the central African region, which together with previous morphological analysis demonstrates that the LSA foragers of the area cannot be readily fit within the known genetic and phenotypic parameters of living foragers. The significance of the Hora 1 site was made further clear by the relocation of several previously known sites also at the mountain, the discovery of four new rock art sites, and the discovery of four very rich new archaeological sites in the mountains adjacent to the floodplain. Here, we describe our renewed work and how it fits with the original findings to offer unprecedented promise for understanding the lifeways of Holocene foragers in central Africa.

Thompson, Kerry (Northern Arizona University)

[334] *Materiality and Movement: Indigenous Concepts in Archaeological Analysis and Interpretation*

As investigations of cultures' material pasts, archaeology's units of analysis are tactile. The concepts we employ need material referents in order to be accessible to archaeological analysis and interpretation. To bring together the scientific method of archaeology with Indigenous frameworks, material referents of Indigenous concepts necessarily require theorizing the dynamic relationship between culture, time, and place in concert with Indigenous perspectives. In scaffolding theoretical structures that are useful to archaeologically understanding Indigenous pasts and building a more inclusive archaeology, our interpretations must account for the movement inherent in many Indigenous worldviews and attempt to work without strict adherence to traditional ideas of static moments in linear time.

Thompson, Lenore and R.C.P. Doonan (University of Sheffield)

[4] *Biographies of Northwest Coast Copper: A Material Investigation*

This paper explores indigenous use of copper metal on the Northwest Coast of North America, and the impact of colonial contact on established cultural practices. Prior to contact (late seventeenth to early nineteenth century), native copper was collected, traded, and manipulated by indigenous communities that considered the material animate and powerful. Following the introduction of foreign trade materials, copper continued to be used to create culturally significant artifacts, however, strict frameworks of interaction with the metal shifted to accommodate the new materials and social relations brought by contact. This investigation adopts a biographical approach, placing indigenous artifacts and the relationships within which they are entwined at the center of the study, allowing us to address particular associations and practices with materials, objects, and assemblages. Analysis includes the combination of archaeological, ethnographic, and traditional indigenous data coupled with a detailed investigation of individual objects, including nondestructive material characterization, to identify procurement, production, and consumption strategies. In this way, it is argued that the study of copper in the Pacific Northwest aids the understanding of aspects of social, economic, and political change set in motion by the contact period.

Thompson, Victor (University of Georgia)

[163] *Plummets, Ritual Dance, Individuals, and Macro-regional Interactions during the Woodland Period in Florida*

Community making during the Woodland period in Eastern North America manifested itself in a variety of material forms, most notably in the wide distribution of elaborate artifacts dispersed as part of Hopewellian related exchange. In this paper, we examine the role that one particular class of artifact, plummets, played in community making during the Woodland period in Florida. Often interpreted as fishing gear, we suggest that instead such artifacts played a large role in community style dances and can be used as indicators of regional and macro-regional exchanges among varying communities. By tracking the various styles and material types found at sites in Florida through a typological and network analysis, we argue that certain sites, such as Crystal River, played a larger role in connecting subregions in Florida, and may have served as cultural brokers across the macro-region due to their connections to Hopewell sites throughout the Eastern Woodlands. Furthermore, it appears that such connections were limited in time and given the prominence of plummets buried with certain individuals, we suggest that specific persons were entwined with some of these larger scale processes.

[110] *Discussant*

[81] *Chair*

Thompson, Victor [81] see Krus, Anthony

Thompson Jobe, Jessica [162] see Meredith, Clayton

Thoms, Alston (Texas A&M University)

[21] *Learning from Earth-Oven Baking Experiments*

Ethnohistoric and ethnographic accounts attest to the dietary importance of wild root foods (i.e., geophytes) and a diversity of earth-oven baking techniques among hunter-gatherer populations in south-central North America. Recovery of charred bulbs and tubers, as well as their microfossils, from ancient earth ovens and fire-cracked rock features illustrate that dependence on wild geophytes and earth-oven technology was widespread by the early Holocene and continued to the historic era. It is readily apparent, however, that observations and studies of living hunter-gatherer populations attest to far more variability in oven morphologies, baking times, and food types than has been identified archaeologically. To better understand relationships between historical accounts and archaeological observations, we have conducted a series actualistic experiments, including baking geophytes for 20–40 hours in large ovens, with and without rock heating elements, and baking meats and geophytes in a variety of small earth ovens for 2–3 hours. Another important aspect of this kind of research is its potential contribution toward bridging persistent gaps between scientific and humanistic approaches to archaeology by calling attention to ancient foodway revolutions and related changes in behavioral systems that accompanied worldwide transitions from paleo to modern diets.

Thornton, Erin [5] see Emery, Kitty

Thornton, Christopher (National Geographic Society)

[70] *Funding "The Human Story" at National Geographic*

For over a century, the National Geographic Society has provided field research grants to archaeologists and anthropologists from around the world, and then told their story through our media. Over the past few years, National Geographic has gone through a tumultuous period of financial instability and schizophrenia between the nonprofit and for-profit arms. The new joint venture created with 21st Century Fox in the fall of 2015 created a fully nonprofit National Geographic Society with a sizable endowment and a 30% share in the for-profit NG Partners (e.g., Channel, Magazine, Travel, Books, etc.). With great wealth comes great responsibility, and National Geographic is looking to make a broader impact in “The Human Story”—i.e., research, preservation, education, and storytelling in anthropology, archaeology, and paleoanthropology—beginning in 2017. A summary of the recent changes at NGS will be presented as well as a first look at our plans for the future.

[29] *Discussant*

Thornton, Erin (Washington State University), Richard Hansen (FARES Foundation, Mirador Basin Project) and Edgar Suyuc-Ley (FARES Foundation, Mirador Basin Project)

[321] *Ancient Maya Animal Use at El Mirador: Subsistence, Ceremony, Exchange, and Environmental Resiliency*

El Mirador (Petén, Guatemala) is among the largest Preclassic settlements in the Maya lowlands. The site has attracted attention due to its size and antiquity, but also for its location within a region containing few permanent or perennial water sources. This study presents a preliminary analysis of the site's faunal remains to assess diet, ritual, habitat use and exchange. Comparison of the El Mirador data with other Preclassic faunal assemblages allows us to assess the degree to which animal use patterns were shaped by local environmental conditions or larger pan-Maya Preclassic dietary and ritual traditions. Although a large portion of the faunal remains date to the Late Preclassic (350 BC–AD 150), remains associated with a Late Classic (AD 600–900) resettlement provides an additional opportunity to address diachronic variation in animal use, and how the local environment may have changed or recovered after nearly 500 years of human abandonment. The dataset is thus significant to documenting the timing/tempo of potential wildlife resiliency in the Maya Lowlands.

Thornton, Taylor (University of Toronto), Jason King (Center for American Archeology), Jason Herrmann (Eberhard Karls Universität Tübingen) and Jane E. Buikstra (Arizona State University)

[241] *Marking and Maintaining Empty Spaces: A View from the Golden Eagle Site*

The Golden Eagle (11C120) site enjoys unique status among prehistoric sites of the Lower Illinois River Valley due to its large earthen enclosure. This elliptical ditch and embankment circumscribes a number of mounds assumed to be of Middle Woodland origin (ca. 50 cal BC–cal AD 400), however, other diagnostic Middle Woodland attributes are absent. Magnetic survey and three seasons of excavations with field crews from the Center for American Archeology in Kampsville, IL, have thus far revealed no significant concentrations of artifacts or other cultural residue within the enclosure. Compared to other Middle Woodland mound sites in the Lower Illinois River Valley, this pattern appears anomalous, though not unprecedented. The Kamp (11C12) and Mound House (11GE7) sites, for example, each include relatively debris-free spaces enclosed by earthen structures. Incorporating evidence both from within and beyond Illinois and the Middle Woodland period, we discuss possible motives for the creation and maintenance of spaces free of material culture.

Thorud, Connor [46] see Dodrill, Taylor

Throgmorton, Kellam J. (Binghamton University)

[266] *Measuring Mobility: Comparing Indices Developed from Architectural and Paleoethnobotanical Datasets*

Thirty years of research on mobility and sedentism shows that population movement occurred for reasons both ecological and social. Population movement could occur over short or long distances, could occur seasonally or generationally, and could involve both small and large groups. While archaeologists have theorized mobility in a variety of ways, they have not developed a robust body of methods for measuring and comparing mobility between households at the intrasite or intersite level. This paper uses architectural and archaeobotanical datasets to create indices of residential mobility. We apply these indices to sites within the Western Puerco Region of east-central Arizona and west-central New Mexico dating between Basketmaker II and Pueblo III (500 BC–AD 1300) to explore long-term trends in mobility. In addition, we discuss the degree of congruence and discrepancy between the indices developed using architectural and paleoethnobotanical data. The research has relevance for research on architecture and residential movement more broadly.

[266] *Chair*

Throgmorton, Kellam J. [301] see Schachner, Gregson

Thulman, David (George Washington University) and Maile Neel (University of Maryland)

[100] *Local Scale Cultural Transmission: How Are Neutral Artifact Traits Manifested at Neighborhood Boundaries?*

Archaeologists are paying increasing attention to prehistoric social organization using learning theory, social networks, and the distributions of artifact variation. A starting assumption is that artifact variation will present an isolation-by-distance distribution, a concept developed by Sewall Wright to explain population genetic distributions. Here we extend Wright's work and adopt his neighborhood model as an analog to explore the small scale interactions between two groups making different variations of the same artifact. We examine the boundary conditions and explore three hypotheses of human behavior that would result from interactions of two groups: blending the shape of both artifact variants, blending of the minority shape, and exaggeration of shape differences to assert ethnic identity. We test these hypotheses against the null hypothesis of no effect with new statistical methods using the shapes of set of Early Archaic projectile points from Florida, defined using landmark-based geometric morphometrics (LGM). The results show no difference in the distribution of artifact shapes that support any of the hypotheses. We conclude the pattern of shape variation was due to long-term residence of males from outside the neighborhood.

Thurber, Hali (American University) and Justin Uehlein (American University)

[336] *You Sleep Alone, Away from People: Understanding the Movement of Hobos and Other Transient Laborers (ca. 1880–1940)*

Throughout the late nineteenth and early twentieth centuries, hobos and other transient workers crisscrossed the nation, taking temporary jobs wherever capital demanded labor that exceeded local resources. Despite their contingent status as surplus laborers, hobos were cast as morally bankrupt deviants, insane, and sexually ambiguous men by media outlets across the nation. State laws and county and town ordinances were summarily passed barring hobos from entering towns, cities, and otherwise populous areas. As a result, hobos were effectively pushed into the margins. Yet, their labor was still a requisite factor in the continued functioning and expansion of U.S. economic networks. In this paper, we utilize ArcGIS platform to build on the results of excavations conducted in the summer of 2016 at a Great Depression Era hobo camp in South Central Pennsylvania—the Delta Trestle Hobo Jungle. In particular, we use GIS to explore the formation of a transient community in proximity to an expanding railroad network that not only linked

industrial centers and natural resources across the Mid-Atlantic, but facilitated the mobility of laboring individuals to sources of employment and sustenance at the turn of the twentieth century.

Thurston, T. L. (SUNY Buffalo)

[324] *Reversals of Fortune: Understanding Shifts in Political Power from Above and Below*

Current social theories from a variety of disciplines offer ways through which we may understand when and why citizens of a polity or subjects a ruler are likely to protest or rise in response to problems in the relationship between governments and those they govern. Some forms of asymmetry and inequality serve as good general predictors of when protest, rebellion, or civil war are most likely to occur, while the ways in which these issues are framed and resolved vary from society to society. In case studies from early historic Europe, both general predictors and unique contexts can be examined using collective action theory, cultural dimensions theory, and the theoretical concepts of political peopleness and reiterated problem solving as keys to understanding the power of those 'above' and 'below' and the outcomes of different kinds of conflicts.

[324] *Chair*

Tiesler, Vera [140] see Chatters, James

Tifental, Emilia (University of Montana) and Kathryn Bobolinski (University of Montana)

[50] *Housepit 54: Dogs and Their Changing Roles*

Excavations at the Bridge River site, British Columbia have been ongoing since 2003. The careful study of these housepits have significantly increased our understanding of the communities that inhabited the Middle Fraser Canyon over 1,000 years ago. The completion of the Housepit 54 excavation has provided further evidence of the many facets of indigenous life at Bridge River; among these is the role of dogs. The possession and many uses of dogs in the Middle Fraser Canyon is well documented through excavations, traditional knowledge, and ethnographic accounts. Domesticated dog remains in Bridge River households have been interpreted as markers of inter-household wealth and status. The current study is aimed at better understanding the role dogs played in the many occupations of Housepit 54. A close analysis of all skeletal remains of canines recovered from Housepit 54 is undertaken with a focus on taphonomic processes; coprolites, dog aDNA, and stable isotope data will also be assessed. We then consider potential interpretations of human behavior regarding dogs.

Tilden, Doug [204] see Slocum, Diane

Tilley, Lorna (Australian National University)

[31] *Extending Osteobiography: Disability, Care, Agency, and Emotion*

Based on evidence in human remains suggesting survival despite functionally-limiting disability, the bioarchaeology of care approach infers provision of health-related care; identifies likely elements of this care; then explores the implications of care practices and outcomes for increased understanding of both the subject of care and their community. A comprehensive osteobiography of the care-recipient (framed within the individual's life course and lifeways, and acknowledging the centrality of individual agency in managing disability) is used reflexively throughout this process to interrogate aspects of the subject's experience. So far, however, this analysis has neglected the role of emotion in shaping behaviors associated with disability and care. Most archaeological discussion of emotion to date has been curiously impersonal, concentrating either on generalized reactions to significant events (ritual sacrifice, violence) or landscapes, or on the 'emotional identity' invested in specific artifacts. In contrast, the impacts of serious disease—frightening, restrictive, demanding, unpredictable—evoke intensely personal emotional responses in sufferers and caregivers alike, and an archaeological focus on emotion in this context may be particularly rewarding. Using case study illustrations, this presentation looks at what happens to osteobiography when the bioarchaeology of care meets the archaeology of emotion.

Tinker, Martin (U.S. Geological Survey)

[313] *Discussant*

Tivoli, Angélica [284] see Zangrando, Atilio

Tjong, Amy [138] see Solovyeva, Vera

Tobe, Shanan S. (Arcadia University), Courtney Mower (Arcadia University), Anna Dhody (Mütter Museum), Carolyn Rando (UCL Institute of Archaeology) and Kimberlee S. Moran (Arcadia University)

[14] *Forensic Techniques to Investigate Museum and Archaeological Samples*

Forensic biologists utilize the latest DNA technologies to deal with low level, difficult, and degraded samples on a regular basis. In fact, forensic testing is specifically designed and validated to be robust under conditions that would cause most other genetic testing to fail. It is therefore no surprise that forensic genetic techniques can assist museums with research questions regarding their collections. Here we discuss how, using forensic techniques and testing, we were able to analyze museum exhibits/samples to determine either species, in the case of nonhuman samples, or, in the case of human samples, genetic profiles including ancestry markers, using Next Generation Sequencing.

Tobe, Shanan S. [14] see Mower, Courtney

Todd, Lawrence (GRSLE), Rachel Reckin (Cambridge), Emily Brush (University of Wyoming), Robert Kelly (University of Wyoming) and William Dooley (GRSLE)

[345] *An Alpine Archaeological Landscape in the Greater Yellowstone Ecosystem, Wyoming*

The alpine archaeological record above 3000m of Greater Yellowstone Ecosystem has received much less research attention than the adjacent plains, basins, and foothills. We have been working in an area of NW Wyoming where dense surface stone tool scatters, stone features (including some of the highest elevation habitation stone circles in the region) are associated with dwindling ice patches that have yielded both perishable artifactual material and an array of wood and bone that provides information on past environments. Since 2014, a 175 ha area at elevations from roughly 3,200–3,500 m has been inventoried from the artifact-based documentation perspective. Locational and basic descriptive data on nearly 20,000 items have been

recorded and provide a glimpse of the complexity and diversity of this high elevation landscape. While there is indeed evidence of big game hunting, there are also indications that the area was used by residential groups in addition to task-specific hunting parties. Data from this inventory are examined in the context of regional landscape distributional patterns.

Todd, Lawrence [88] see Brush, Emily

Todisco, Dominique [226] see Borrero, Luis

Toffalori, Elena [37] see Perlingieri, Cinzia

Tokanai, Fuyuki [358] see Takigami, Mai

Tokovinine, Alexandre (University of Alabama)

[39] *Copan Reloaded: A New Look at the Ante Step and Its Context*

This presentation reassesses the chronology and meaning of the inscription on the hieroglyphic step of the Ante structure at Copan, Honduras. The analysis was made possible by a high-resolution 3D scan of the step produced in 2011. The new interpretation indicates that the city of Copan underwent a re-foundation event upon the accession of its eighth ruler, Wi' Ohl K'inich. The known contexts of similar statements are discussed along with the implications of several possible translations for our understanding of the sixth-century history of Copan during the crucial transition between the Early and the Late Classic. The textual information is compared to other data from the same period.

[39] *Chair*

Tolaba, Jose Luis [222] see Albeck, María

Tomaskova, Silvia (UNC Chapel Hill)

[65] *Discussant*

Tomasto-Cagigao, Elsa (Pontifical Catholic University of Peru) and Luis Jaime Castillo (Pontifical Catholic University of Peru)

[308] *Artisan Production and Morphological Changes in Skeletons from San Jose de Moro (North Coast of Peru)*

The study of occupational stress markers was an attractive investigation field some years ago, due to the alleged possibility for the identification of ancient activities through skeletal changes. Nevertheless, a critical vision of the issue evidences that this relation is not so easy to establish, because bone biology is complex and also because different activities may produce similar changes. This does not mean that this type of studies should be abandoned. On the contrary, it is a call for more rigorous methodologies and for the building of a corpus of information about changes occurred on skeletons from individuals with known activities in life. In this presentation we show the results of the analysis of four skeletons from different epochs that were excavated in the prehispanic cemetery of San Jose de Moro (North Coast of Peru). These skeletons were associated to elements related to metal and textile production. We searched the processes performed by modern artisans in the region to produce metal and textiles, and we explore if there is a congruency or not between the observed changes in the skeletons and the activities suggested by the funerary goods.

Tomczyk, Weronika (University of Warsaw)

[316] *Local Food, Exotic Sacrifices: The Tentative Summary of the Animal Management in Castillo de Huarmey.*

Even through the majority of faunal remains so far recovered at Castillo de Huarmey site derived from ceremonial contexts (i.e., main mortuary mausoleum and adjacent palatial complex), studies demonstrate that at the very least, the site's elite inhabitants extensively exploited local resources, and simultaneously benefited from developed trade connections. At the core of animal management was the extensive camelid husbandry. The standard zooarchaeological analysis and mortality profiles indicated that camelids served as a source of meat, pelts, and material for bone tools. Stable isotopic analysis, together with research on bone pathologies confirm the local origin of most animals, but not of all. Distinctive isotopic ratios and vertebrae pathologies suggest usage of few camelids as beasts of burden. Scarce marine birds and sea lion (*Otaria flavescens*) findings suggest limited utilization of marine resources as well. Additionally, the presence of exotic and non-consumable species such as: monkey (f. *Atelinae*), condor (*Vultur gryphus*) and parrot (*Amazona aestiva*) in the sacrificed assemblage possibly reflects long-distance trade and is a sign of Castillo's importance as a local Wari capital.

Toney, Joshua (Garcia & Associates) and Michael Desilets (Garcia & Associates)

[302] *Searching for the Lost Marines of Guadalcanal*

In early 2016, Garcia & Associates conducted forensic archaeological investigations for the Defense POW/MIA Accounting Agency (DPAA) on Guadalcanal, Solomon Islands. DPAA (formerly JPAC) is the Department of Defense agency tasked with providing the fullest possible accounting for missing American service personnel from past wars. During World War II, the Battle for Guadalcanal lasted from 7 August 1942 to 9 February 1943 and included intense ground fighting to secure the airstrip known as Henderson Field. Not including sea battles, more than 1,200 Marines and 26,000 Japanese soldiers were killed during the six-month battle in the Solomon Islands. As part of its continued effort to recover and identify missing U.S. war dead, DPAA has increased its effort to foster public-private-partnerships (P3) to maximize the number of missing personnel accounted for through search and recovery operations. GANDA was fortunate enough to participate in one of the first P3 operations. The GANDA team, working closely with DPAA personnel and local informants, conducted investigative and data recovery excavations at a suspected war-time burial site possibly associated with one of the more than 500 Marines that remain missing in action in the Solomon Islands today.

Tong, Tao [115] see Zhang, Xu

Toniello, Ginevra (Simon Fraser University, Hakai Institute), Dana Lepofsky (Simon Fraser University, Department of Archaeology) and Kirsten Rowell (University of Washington, Department of Biology)

[380] *Ancient Clam Gardens and Ecological Enhancement on Northern Quadra Island, British Columbia*

Clam gardens, anthropogenic rock-walled terraces built at the lowest intertidal, are part of an ancient system of mariculture of the Indigenous people of the Northwest Coast of North America. The construction of clam gardens increased shellfish production by increasing ideal clam habitat and creating substrate preferred for clam growth. On Northern Quadra Island, where there is a dense concentration of clam gardens, we assess bivalve productivity of clam gardens by 1) calculating how much clam habitat is created by constructing clam garden terraces; and 2) comparing the growth rate of clam shells from clam gardens with those from non-cultural contexts. In Kanish Bay, over 80 clam garden features result in an increase of 20,000 to 34,000 m² of clam habitat. Butter clam (*Saxidomus gigantea*) specimens spanning 11,500 years allow us to analyze patterns of clam growth throughout Holocene. By expanding our ecological understanding of clam gardens, this analysis enhances our understanding of the extensive ecological knowledge of marine environments held by coastal First Nations.

Toniello, Ginevra [47] see Neudorf, Christina

Tonoike, Yukiko (Yale University) and Dawn Brown (Yale University)

[193] *Beyond Impressions: Systematizing Sherd Identification Using the Yale Khabur Basin Project Collection*

The first step in ceramic analysis is typically to determine the age or cultural affiliation of the sherds. Traditionally, this process is done through comparisons of superficial attributes to those of sherds that are already known. This task is difficult to do without years of region-specific experience and knowledge. Using the ceramics collected from over 300 sites, ranging over 5,000 years through surface collecting survey in northeastern Syria by the Yale University Khabur Basin Project (KBP), we plan to systematize this identification process using a method akin to that used in biological keys. We aim to determine the age of an unknown sherd through a system of observations, rather than just impressionistically. Such a systematic approach should improve consistency among analysts, particularly those without firsthand knowledge of ceramics from the various periods of this region. This poster shows the first attempt at developing such a system, using the example of bowls from the KBP. Beyond the superficial inspection of sherds, we plan to carry out additional modern technical analyses to augment the macroscopic observations with other aspects such as paste, temper, clay, and firing.

Toohy, Jason (University of Wyoming)

[147] *Discussant*

Toro, Fabian (University of Pennsylvania), Chantel White (University of Pennsylvania) and Joyce White (University of Pennsylvania)

[177] *Developing a Legacy Collection of Traditional Rice Cultivation: Implications for Archaeobotanical Study*

Legacy ethnobotanical collections have untapped potential to elucidate human-plant relationships through time and space. This paper examines a subset of a comprehensive ethnobotanical collection undertaken in 1979–1981 in northeast Thailand. The subset comprises 43 traditional rice cultivars and wild forms, each collected along with detailed information about cultivar-specific uses and growing conditions. Our study includes morphometric examination of grains and spikelet bases with the objective of documenting variability within both individual spikes and across the species continuum. Ultimately this examination provides a platform for thinking about domestication processes in the past and interrelationships between wild and cultivated forms, particularly when considering harvesting times and field conditions. These data and this legacy collection can be used as a comparative for archaeobotanical assemblages as well as future genetic studies.

Toro, Fabian [261] see Dawson, Emily

Torpy, James (University of Michigan), Paul Nick Kardulias (College of Wooster) and Drosos N. Kardulias (Wooster High School)

[90] *The Eye in the Sky: Use of an Aerial Drone to Record Landscape Alteration in the Malloura Valley, Cyprus*

The use of unmanned aerial vehicles or drones on archaeological projects has proliferated over the past few years. As with many new technologies, the use of drones has gone through several phases. Initially, there is the fascination with a new instrument, followed by more sober assessment of how the equipment can be used to address questions of scholarly interest. In an effort to record the changes in the local landscape of our study area in central Cyprus, the Athienou Archaeological Project used a drone to take aerial still shots and video. One issue that drone users increasingly face is the development of new regulations. Because of our location in the UN buffer zone, we obtained permission from national and local government offices and the Cypriot National Guard. In seven flight episodes we took aeriels of an Archaic-Roman Sanctuary, buildings from the adjoining Roman-Medieval settlement, two groups of tombs to the north, remnants of an early twentieth century house, a stone basin production site, and an Aceramic Neolithic quarry. Comparison of these images with aerial photos from the 1960s allows us to monitor the evolution of the Malloura Valley and the impact on archaeological sites of agricultural transformation of the landscape.

Torpy, James [89] see Trudeau, Nicholas

Torquato, Melissa [191] see Hawkins, Hannah

Torreggiani, Irene [326] see Gill, Lucy

Torres, Mauricio, Andrea Chávez, Andrea Méndez and Byron Ortiz

[62] *Proyecto Arqueológico Cochasquí-Mojanda*

El Parque Arqueológico Cochasquí se encuentra en las estribaciones sur orientales del macizo montañoso de Mojanda, en la provincia de Pichincha a 52 Km al norte de Quito. El sitio está conformado por 15 pirámides truncas, casi todas conservando sus rampas que facilitan el acceso a la parte superior. En el mismo espacio se puede encontrar varios montículos circulares. En 1932 Max Uhle—el primer arqueólogo en realizar excavaciones dentro del sitio—concluyó que las pirámides fueron sitios ceremoniales y rituales. 30 años más tarde, una misión arqueológica alemana bajo la dirección de Udo Öberem, establecieron dos fases de ocupación del sitio: Cochasquí I, de 950 DC hasta 1250 DC; y, Cochasquí II, de 1250 hasta el 1550. El proyecto arqueológico Cochasquí—Mojanda ha iniciado con la búsqueda de nuevos datos que permitan ampliar la comprensión global de la estructura del sitio así como su posición regional. Para ello se ha recurrido a la aplicación de recursos tecnológicos no intrusivos como el uso de ground-penetrating radar (GPR), así como modelamiento 3D a partir de fotografía área con drones, e información LIDAR.

Torres, Paola [218] see Andrieu, Chloé

Torres Ochoa, Cesar [329] see Magnoni, Aline

Torres-Rouff, Christina [134] see Pestle, William

Torres-Vélez, Lyrsa María (Boston University)

[289] *Cookbooks as Documentary Sources: The Material Culture of Kitchens and Tables from Nineteenth-Century Puerto Rican Households*
Puerto Rico's culinary history is characterized by a blend of the different ethnicities that settled in the island after the Spanish Conquest, as well as the incorporation of precolumbian food ways. This ethnogenesis can be studied through the culinary traditions that conform what we now refer to as criollo. This presentation uses *El Cocinero Puerto-Riqueño*, the only cookbook available from the nineteenth century in Puerto Rico, as a primary source to address the material culture associated to activities related to kitchens and food consumption. First, by applying research methodologies previously proposed and used by Elizabeth Scott and Mary Beaudry, we will demonstrate the research potential of cookbooks to establish the utensils used for both food preparation and serving. Then this data will be used to outline the type of objects that could have been found in certain nineteenth-century Puerto Rican households. Lastly, we will like to address the social context in order to pose questions regarding who might have had access to the book, as well as how culinary traditions might have been passed from one generation to the next.

Torvinen, Andrea (Arizona State University)

[352] *Establishing the Nature and Scale of Ritual Behavior at La Quemada, Zacatecas, Mexico*

The northern frontier region of Mesoamerica is partially defined by its ceramic traditions (i.e., red-on-buff, incised-engraved, and resist); however, observed variation in the types belonging to decorated wares suggests these types are likely local materializations of a regional ideology. Testing this hypothesis requires first determining the provenance of decorated ceramics recovered from a northern frontier site and then exploring the intrasite distribution of local and nonlocal ceramics through the lens of different social mechanisms. The case study for this project is La Quemada in Zacatecas, Mexico, which was the focus of the Malpaso Valley polity during the Epiclassic period (AD 500–900). La Quemada lacks evidence supporting the existence of an elite class or marketplace, but does possess traits associated with pilgrimage centers. Therefore, this paper uses an ethnographic model of prehispanic ritual practice based on northern frontier descendant communities (i.e., the Huichol and Cora) to evaluate if ritual ideology was the mechanism responsible for regional ceramic traditions. The conclusions of this research will establish the nature and scale of ritual behavior that may have occurred in northern frontier centers (e.g., La Quemada, Alta Vista, and Cerro Moctehuma), as well as the impact of this behavior on intraregional social networks.

Tosa, Paul (Pueblo of Jemez), T J Ferguson (University of Arizona), Matt Liebmann (Harvard University) and John Welch (Simon Fraser University)

[34] *Hemish Migration, Movement, and Identity*

We examine migration, travel, landscape, and place names as key elements of Hemish (Jemez) identity. Language is a key element of Hemish identity, and place names figure prominently in Hemish historical and cultural discourse. The place names that define the footprint of Hemish ancestral territory are associated with the migration that culminated in the occupation of Walatowa and with pilgrimages and land use that take Hemish people back into areas where their ancestors formerly lived. Jemez migration involved movement from the north to the Jemez Mountains, with a few groups later moving from the Jemez Mountains to areas to the south and back, and finally the entire Hemish population moving from large villages in the mountains to Walatowa. The many Hemish ancestral archaeological sites and trails that mark the landscape are physical expressions of past and present land use that figure prominently in the formation and transmission of Hemish identity.

Tosello, Gilles [210] see Fritz, Carole

Towner, Ronald [188] see Renteria, Rebecca

Townshend, Russell [159] see Sampeck, Kathryn

Toyne, Jennifer Marla (University of Central Florida)

[29] *Where Condors Reign: Methodological Challenges in the Bioarchaeology of Chachapoya Cliff Tombs in Peru*

Traditional archaeological practice involves horizontal mapping and excavations of ancient settlements and cemeteries, but bioarchaeological research of mortuary practices in the Chachapoyas region of northeastern Peru is stymied by the challenging vertical slopes, almost constant rain, and the placement of burial structures on seemingly impossible to reach ledges on exposed rock escarpments. Exploring and registering archaeological vestiges of these cliff cemeteries requires the combination of “vertical archaeology”—using rappelling and rope technology to reach tombs as directly as possible to engage in traditional methods of recording using meticulous photography and drawings—and 3D photogrammetry as well as long distance and aerial drone photography. This paper discusses the methods used at the site of La Petaca and Diablo Wasi and the major challenges faced including natural and technological impediments. We attempt to identify and reconstruct how and why the ancient Chachapoya people created and placed their dead using both up close and personal observations as well as remote recording techniques. Many archaeological details cannot be seen from a distance and yet many locations could not be physically reached safely. We continue to explore how to combine these datasets in meaningful and accessible ways for both local and scientific communities.

Trabert, Sarah [339] see Hill, Matthew E., Jr.

Trachman, Rissa (Elon University)

[83] *The Ancient City of Dos Hombres: Material Expressions of Power*

Investigations at the ancient Maya city of Dos Hombres have been guided by an interest in social, political and economic organization, based on architecture and material culture remains. Excavations in the civic ceremonial center of Dos Hombres have been focused in the northern plaza, a very public space that likely was a place of commerce, public ritual and sacred space, thereby the prime backdrop for publicly legitimizing authority. Newly

excavated data, especially architectural exposures as well as material culture deposits are presented. These new data are rich with information about public activities and architectural programming at the ancient city. New material culture analyses, including that of the ceramic deposit unearthed from a range structure in the northern plaza are presented. Recent XRF data reveal that most of the obsidian found thus far at Dos Hombres originated at El Chayal, both in the Early Classic and in the Late/Terminal Classic. The resulting lines of evidence delineate various expressions of power by the Dos Hombres polity and elucidate social and economic relationships, both individually and collectively, of the ancient Maya at Dos Hombres and northwestern Belize.

Tramel, Nichole [97] see Schields, Rebekah

Trask, Willa (Defense POW/MIA Accounting Agency), Kristin Hoffmeister (Texas A&M University) and J. Alex Canterbury (Texas A&M University)

[162] *Life and Death in the Southeastern Maya Periphery: Bioarchaeological and Isotopic Analysis of the Uxbenká Burial Population*
The southern Belize region is typically considered geographically and culturally peripheral to the primary activity areas of the ancient Maya. Although researchers have documented the development of a "southern Belize style" in terms of architecture and material culture, to date very little systematic work has been undertaken to understand health, diet, and mortuary behavior in the region. Ten years of excavations at Uxbenká have yielded rich evidence of a continuous occupation spanning from the Late Preclassic to the Terminal Classic, with evidence of human activity at least as early as the Archaic period. Human burials were recovered from a diverse range of civic and residential contexts, providing substantial insight into life and death among the ancient Maya of southern Belize. This paper draws on skeletal, dental, mortuary, archaeological, and isotopic data as a means to investigate health, diet, and mortuary trends at Uxbenká during the span of its occupation. We also identify continuing evidence of ancestor veneration and status disparities reflected in burial practices and mortuary treatments. These studies expand our understanding of the biological consequences of increased social complexity as the Uxbenká polity transformed from a small agricultural community into an important regional geopolitical center.

Traslavina Arias, Abel and Steven A. Wernke (Vanderbilt University)

[75] *Remodeling the Liturgical "Backstage" of the Parish of Santa Cruz de Tuti, Colca Valley (Arequipa, Peru)*
The Toledan resettlement during late decades of the sixteenth century in the viceroyalty of Peru involved a series of changes in the territory for Andean people at different levels, from household to the public and religious spheres. In the case of the reducción (planned colonial town) of Santa Cruz de Tute, the religious sphere was transformed and materialized into a new core of buildings and spaces: the church, its parish, and plazas. The parish and casa cural (rectory) was a liminal space in terms of a very particular form of combined domestic/private/public/sacred functions for clergy and laity. In these terms, its internal organization depended on the set of ideas (a discourse) which to orchestrate people's daily and liturgical praxis. This paper explores the changes around the parish as a backstage area in this orchestration, and what was involved in its spatial remodeling over nearly three centuries of occupation. To approach this context we use three sources: ecclesiastical text documents, the preliminary results of excavations, and architectural analysis to better understand the physical links between elements and spaces and the modification of movement into and through the parish complex.

Tratebas, Alice (Bureau of Land Management)

[273] *Conservation and Preservation Issues Post Fire*
Wildfire damage to rock art can have long-term effects. Panels may continue to spall over time from the fire damage or from the effects of soluble salts that were activated and spread during the fire. Rock outcrops and slopes may become destabilized after fire denudes vegetation. Panels can be buried or have ashy sediments washed down from the cliff tops above. What happens over time after wildfire kills lichen growing on rock art? Observations and studies following two large wildfires that damaged an extensive petroglyph site provide insights into long range issues in site preservation.

Trautwein, Emily, Stephen Nash (Denver Museum of Nature & Science), Michele Koons (Denver Museum of Nature & Science) and Deborah Huntley (Denver Museum of Nature & Science)

[303] *The Reserve Area Archaeological Project*
Since 2014 archaeologists from the Denver Museum of Nature & Science's Reserve Area Archaeological Project (RAAP) have conducted survey work in the greater Reserve, New Mexico region. They examined numerous tracts in a range of biomes to better understand the highly variable topographic setting and archaeological settlement patterns, documenting dozens of new sites in the process. After spending a week in the New Mexico site files in Santa Fe in March 2016, the team also spent substantial time and effort re-locating and re-recording many previously (and often poorly) recorded sites in the region. The team's future research will focus on the Torriete Lakes region north of Reserve, where a single isolated great kiva exists within a broad, high-altitude meadow. Small pueblos scatter the landscape like satellites around the great kiva and appear to encompass both the Reserve and Tularosa Phases. Survey work in 2017 will focus on a more detailed survey of the Torriete Lakes region, hopefully allowing us to parse the comparatively ephemeral Reserve Phase occupation from the more substantive Tularosa Phase occupation. All of this will be done with an eye toward initiating an excavation program in 2018.

Traxler, Loa (University of New Mexico)

[39] *Foundations to the Late Classic Kingdom: Copan in the Sixth Century CE*
Historical and archaeological data support interpretation of Classic Maya polities as centralized states—strongly integrated organizations with stratified and hierarchical political structures led by rulers wielding coercive power. Yet archaeology is often hard pressed to identify changes instigated by individuals or events, or define watershed moments when particular sites or regions coalesced as states. By the early sixth century CE, the kingdom of Copan had established itself as a dominant player in the southeastern frontier of the Classic Maya world. With control over subordinate polities and trade relations, the royal house had wielded power for over a century laying the foundations for the Late Classic dynasts and their detailed histories. Prior to the strengthening of the state under Ruler 11 (reigned 578–628), Copan's history records a succession of rulers who managed internal growth and likely faced regional population movements and the political challenges that accompanied them.

Trein, Debora (University of Texas at Austin)

[83] *Power, Space, and Place in the Heart of La Milpa*
La Milpa was one of the largest ancient Maya urban centers in the eastern Maya Lowlands during the second half of the Late Classic to the Terminal Classic periods, its influence extending over communities throughout the Three Rivers Region of northwestern Belize. La Milpa's rise to regional prominence is associated with a series of upheavals during this period, including increased political dynamism following the decline of Tikal at the end of the Early Classic period, and a dramatic rise in the population of the Three Rivers Region. In this presentation we provide a synthesis of the research conducted over the past ten years at La Milpa, utilizing multiple datasets to chart the cultural trajectory of this large urban settlement. Further, we explore ways in which the residents of La Milpa and surrounding communities may have articulated their position in the region through the design, access, and

use of the built environment of La Milpa. We suggest that La Milpa's architecture provided an arena for members of the La Milpa polity to interact with one another and negotiate changing social, political, economic, and environmental conditions in the region, through both extraordinary events as well as mundane activities.

[83] Chair

Trein, Debora [83] see Valdez, Fred

Tremain, Cara G. (University of Calgary)

[310] *The Many Lives of Maya Antiquities: Tracking Distribution and Redistribution through Auction Catalogues*

Glossy sales catalogues published by high-end auction houses present a seemingly endless supply of antiquities for purchase from around the world. These catalogues offer insight into market trends and allow the volume of antiquities being bought and sold at auction to be monitored. At a time when the internet auction market is growing, and the publication of information in catalogue form is declining, it is important to record and share data from available sales catalogues. This paper presents the results of a systematic study of Maya antiquities at auction, using sales catalogues that cover a period of more than 50 years. Quantitative studies of auction catalogues are useful for understanding the volume of antiquities that have been bought and sold at auction; the types of antiquities that are more vulnerable to looting and forgery; and whether the market is becoming more or less opaque with respect to provenance. Studies such as these, although time consuming and hampered by the difficulties of accessing information, are important for an understanding of the past and current market in antiquities.

[310] Chair

Tremayne, Andrew H. (National Park Service) and William Brown (University of Washington)

[190] *Mid-Late Holocene Population Trends and Maritime Resource Intensification in Western Alaska*

Population growth has long been argued to play a critical role in promoting cultural evolution, operating both through adaptation to population pressure and increasing social network size and transmission frequency. We present a model of mid-late Holocene Alaskan population size based on a temporal frequency analysis of 902 site occupation episodes dating between 6000 and 1000 radiocarbon years BP, with two objectives: 1) identify factors that influenced Alaskan population dynamics over this interval, and 2) bring these to bear on our understanding of the cultural transition from the Arctic Small tool tradition (ASTt) to the Norton tradition. To evaluate the influence of environmental factors and population size on future population growth and cultural change, we regress growth rates derived from our population model on 1) GISP2 temperature data; 2) the 3600 cal BP Aniakchak eruption; and 3) the population model itself. Paradoxically, the ASTt-Norton transition, which apparently increased cultural complexity, transpired during a sustained low-population interval driven by the eruption and extreme temperatures. We tentatively resolve this paradox by suggesting that severe subsistence stress entailed by these environmental factors encouraged late ASTt communities to shift focus from terrestrial to marine resources, promoting technological innovations to better exploit the marine habitat.

Tremayne, Andrew H. [173] see Buonasera, Tammy

Tremblay, Anna (Pennsylvania State University) and Daniel E. Ehrlich (Dickinson Excavation Project and Archaeological Su)

[234] *7 × 105 Dimensions of Pottery: Multivariate Analyses of Pottery Assemblages from the Lower Town Site of Mycenae, Greece*

During excavation, it is often safer to record areas separately and later identify associations between strata across a site. Such practice waits until detailed analyses can be conducted and avoids erroneously comparing material from separate depositions. However, the process can lead to more identified strata than are truly present. This project considered relative frequencies of pottery fabrics as a multivariate dataset to characterize and analyze site formation at the Lower Town site of Mycenae, Greece. Mahalanobis distance (D₂), hierarchical clustering, and principle components analysis were used in order to quantitatively assess 841 pottery units. These units, on average containing 215 sherds, represent 41.7% of all pottery recovered during the multiyear excavation. Dendrograms and Multidimensional Scaling were used to visualize distances and clusters in order to characterize relationships between the 416 individually named strata on site. Data showed high degree of patterning and formed between 7 and 54 groups. This method proved highly effective in identifying putative associations across a large site. Importantly, this method does not require whole or decorated ceramic material, can be calculated relatively quickly, and is sensitive to detecting relatively small differences in assemblages.

Trever, Lisa [134] see Tripevich, Nicholas

Treyvaud, Geneviève [178] see Auger, Réginald

Triadan, Daniela (University of Arizona)

[329] *Discussant*

Triadan, Daniela [236] see MacLellan, Jessica

Tricarico, Anthony (University of South Florida)

[93] *Discussant*

Trigg, Heather (University Massachusetts Boston)

[128] *An Exploration of Indigenous Participation in Spanish Economic Activities in Seventeenth-Century New Mexico*

When the viceroy of New Spain gave permission for the establishment of the colony of New Mexico in the late sixteenth century, he acknowledged the importance of indigenous people to the colonial enterprise, urging the governor to treat indigenous Pueblo people kindly so that they would work for the colonists. The Spanish colonists' economy largely consisted of the barter of subsistence goods. Throughout the seventeenth century, Pueblos and other indigenous peoples both engaged and were integrated into the colonial economic activities in various contexts and in various ways. Pueblos were forced to provide labor for construction and agricultural pursuits, and they were obliged to pay tribute in goods that were commonly used in the barter economy. Yet, the production and exchange of certain items appears to have been controlled by the Pueblos. In this paper, I address the intersection of indigenous activities and Spanish colonists' economies. An archaeological perspective of colonists' households along with documentary data illustrates some of the

ways indigenous peoples participated, both voluntarily and coerced, in economic activities. These interactions ranged in scale from daily household activities that were informally negotiated and contextualized to more formal economic structures regulating tribute and long distance trade.

Tringham, Ruth (University of California-Berkeley)

[172] *Closely Observed Layers: Small Stories and the Heart*

When I tell people I'm an archaeologist, their eyes light up with a wistful look and they say "I've always wanted to be an archaeologist." I could describe one reality, that it is not as glamorous as they think, work is slow and repetitive, and that leaves them disappointed. But usually I describe another reality: what I love about what I do—and they are delighted. However, I have never articulated it in a professional presentation or publication: I excavate layers of dead people's residential debris; my trowel gradually reveals the thousands of events that have created the layers and material fragments of past lives. Meanwhile, my mind is joyfully busy inside my head, making sense of the layers, using all my senses and intuition to plan where my hands-with-trowel should go next, respectfully fearful of the responsibility of the decision. At the same time my mind buzzes with all the small stories that rise up out of the debris of the dead residents. This presentation, inspired by the writing of George Saunders, will find the heart in the specifics of the archaeological record and the slow versioning of their myriad stories from source to sharing with the world.

[37] *Discussant*

Tringham, Ruth [70] see Ashley, Michael

Trinh, Sabrina [29] see Meyer, Dominique

Trinidad-Rivera, Gelenia (University of Puerto Rico—Rio Piedras Campus)

[289] *The Jácanas Archaeological Collection: Laying Down the Facts*

While researching an archaeological collection, it is important to trace its history in terms of its origins, what makes up the collection, where it is located, and who is responsible for it. Jácanas, a precolumbian site in Ponce, Puerto Rico, was excavated during the first decade of the twenty-first century. The fieldwork was carried out by a nonlocal cultural resources management company under contract with the United States Corps of Engineers (USCE). Among the many concerns expressed by local archaeologists was the fact that the collection was taken to the United States for analysis. In 2013, the Jácanas collection was transferred to the Museo de Arte, Historia y Antropología, of the University of Puerto Rico, Rio Piedras campus. This paper will outline the history of the Jácanas collection using the records and documentation provided by the USCE to the Museum, and concentrate on the transfer process. What archaeological materials were transferred? What type of fieldwork and laboratory documentation exists? How was the collection catalogued? This investigation wants to provide the general public with an understanding of what materials are available for future research projects.

Triozzi, Nicholas, Anna Semon (UNC Chapel Hill/American Museum of Natural History) and Thomas Blaber (American Museum of Natural History)

[365] *Causes and Consequences of Pre- and Protohistoric Social Network Connectedness in Coastal Georgia*

This poster considers social networks derived from artifact assemblages and interment types from early-Irene and late-Irene and protohistoric mortuary contexts on the Georgia (USA) coast. Network analysis can be used to evaluate potential interactions between community members represented in mortuary contexts. The R statistical program is used to model social networks according to multiple parameters and generate statistical indices of network connectivity. I propose that these indices are a function of external forces (e.g., political and economic pressures, or dramatic changes in climate) acting on connections among individuals in a community and between geographically separated, but culturally affiliated communities. If intersite, cross-temporal, social networks can be demonstrated from artifact assemblages, then the connectivity of each network may be consequences of, or causal to micro-regional external forces. The historic, archaeological, and paleo-climatic records frame this interpretation of network connectivity.

Triozzi, Nicholas [365] see Blaber, Thomas

Tripevich, Nicholas (UC Berkeley), Lisa Trever (UC Berkeley), Chris J. Kennedy (UC Berkeley), Eric Kansa (Alexandria Archive) and Michael D. Glascock (University of Missouri)

[134] *Open Obsidian Geochemistry Visualization System for the Andes*

Obsidian sourcing studies that provide valuable insights into archaeological mobility and interaction are enhanced by the availability of geochemical analyzers, and especially by the proliferation of portable X-ray fluorescence units. This year we are introducing an open-source system for analysis of geochemical datasets available in web-based repository and based on R-Shiny, a browser based analysis and visualization system built on the R project. The Andean Geochemistry data archive, a new project hosted at OpenContext, combined with the R-shiny based analysis system, allows researchers to explore geochemical data interactively. We have uploaded a number of geochemical datasets from the Andes to demonstrate the effectiveness of this approach when many datasets are available in a given area and to encourage more researchers to share their data in an open framework. While there remain obstacles to productive comparison of geochemical data in a given region, including problems with inter-instrumental comparability in particular, this system provides an architecture for sharing and visualizing these data in an open format to foster greater comparison between projects going forward.

Tripevich, Nicholas [88] see Capriles, José M.

Trites, Andrew (UBC Marine Mammal Research Unit) and Frances Robertson (UBC Marine Mammal Research Unit)

[387] *Archaeological Data from Washington State Indicate That Northern Fur Seals Will Likely Once Again Be a Dominant Predator in the California Current System*

Northern fur seals (*Callorhinus ursinus*) of all ages (pups, juveniles, bulls and adult females) dominate the mammal assemblage of prehistoric (prior to 1850) coastal middens from California to Alaska. We reviewed archaeological data, historical documents on the early fur trade, as well as more recent data on fur seal genetics and migratory patterns of fur seals—and discovered that most of the fur seal remains in Washington State middens likely originated from a very large colony of northern fur seals that Russian sealers extirpated from the Farallon Islands (California) in 1840. Additional fur seal remains likely originated from the Bering Sea (Alaska). Prehistorically, native hunters regularly traveled 50 km or further offshore in open canoes during the winter and spring migration of northern fur seals along the continental shelf break to obtain fur seals (and other species). We hypothesize that sealing likely led to the development of exceptional seamanship and was the stepping stone to whaling. The data we compiled further indicate that fur

seals were once a dominant species in the California Current system, and that they are likely to again dominate this ecosystem now that they have reestablished a breeding colony on the Farallon Islands.

Trites, Andrew [378] see Robertson, Frances

Troncoso, Andrés

[375] *Why Did People Begin to Make Rock Art? A Case Study from North-Central Chile*

The origin of rock art has frequently asked from an evolutionary and cognitive perspective to understand the dawn of making images in the Paleolithic. But in many regions of the world the beginnings of rock art production occurred later. North-central Chile is one of these places. In this area, the practice of marking and chipping rocks surfaces started around 2000 BCE in coherence with the transition from the Middle to the Late Holocene and the start of many transformations in the hunter-gatherer's way of living. Our paper approaches this question, discussing how this new practice and materiality in the start of rock art in the area was a result of new relationships with the world, landscapes and the substances that composed it.

Troncoso, Andrés [143] see Méndez, César

Troskosky, Christopher B. [90] see Ruhl, Erika

Trousdale, William B. [297] see Allen, Mitch

Trudeau, Nicholas, James Torpy (University of Michigan) and Travis Williams (University of Michigan)

[89] *Preliminary Analysis of Archaic Lithic Material from the Murrell Home in Cherokee County, Oklahoma*

In 2016, excavations at the George M. Murrell Home, a mid-nineteenth-century plantation home located in northeastern Oklahoma, yielded a number of chipped stone artifacts attributable to the Archaic period. Abandoned during the Civil War, the Murrell home is currently owned by the Oklahoma Historical Society and run as a living history museum and park. Located near the confluence of three major waterways, the site lies in an ecotone between broadleaf forests and prairie parkland. The lithic assemblage includes both finished tools and flaking debris made from local material as well as material from other locales. Agriculture has disturbed and decontextualized many of the recovered artifacts, and remote sensing failed to reveal any features which might be associated with the site. This study presents an analysis of the chipped stone assemblage in an effort to determine the role of the site, estimate the duration of occupation, and identify potential linkages to nearby contemporary sites.

Truex, Lise (University of Chicago)

[297] *Working for the Palace, Working for the House: How Households Became a Neighborhood in Late Third Millennium BC Tell Asmar (Ancient Eshnunna), Iraq*

To test the value of the neighborhood concept in archaeological practice, this paper relies on a model of socioeconomically diverse, urban Mesopotamian neighborhoods and tests the model by analyzing households within a neighborhood at Tell Asmar, Iraq. Tell Asmar became one of several major urban settlements in the Diyala River region, with occupation of the site extending back into late prehistory. The dataset comprises a subset of archaeological evidence recovered from the Tell Asmar Northern Palace and Private Houses Area by the 1930s Diyala Expedition excavations and concentrates on late third millennium BC occupation levels, architecture, artifacts, and ancient texts. Using methods of household archaeology to reconstruct household wealth, this paper investigates household artifacts and their findspots within houses, making inferences about activities taking place in different household loci. An analysis of several houses compares households with life cycles spanning the late third millennium BC with late Akkadian households that appeared alongside the architectural reorganization of the Northern Palace. By reconstructing households in the context of the material culture of the Early Dynastic city-states and the Akkadian state, this paper shows how households functioned as a neighborhood, one experiencing growth, decline, and resurgence connected to broader socioeconomic and political developments.

Truhan, Rebekah (University of Iowa), Jacob Foubert (University of Iowa) and Luke Stroth (University of California, San Diego)

[342] *Technological Approach to Fire-Cracked Rock*

Fire-cracked rock (FCR) is an artifact category that has not received much attention, normally reduced to counts and weights. However, FCR is a dynamic material that undergoes a specific sequence of changes. In this poster, the authors propose different "stages" corresponding to different hot rock technologies and features, such as hot rock cookery, hearths, and limestone temper. An experiment is designed to identify the physical and geochemical changes that occur during hearth construction and maintenance, and a methodology is proposed to identify those changes in the archaeological record. Using the archaeological assemblage of FCR from Woodpecker Cave, a Late Woodland rockshelter, we are able to use physical and geochemical changes combined with ethnographic analogy to show the sequence of maintenance behaviors performed on a hearth feature.

Truhan, Rebekah [342] see McGrath, James

Truex, Kate (University of Missouri)

[282] *Evaluating Socioeconomic Status at Maasplein Using Food Utility Indices*

A number of researchers have inferred socioeconomic status using zooarchaeological data in contexts suggested by artifacts to reflect a particular status level. Cuts of meat that are of relatively high yield ("utility") should be more economically valuable than low yield parts. A model of carcass-part utility assumes that people of high socioeconomic status will preferentially acquire greater relative frequencies of high yield parts than people of low status. The model is applied to the Roman town site of Maasplein, the Netherlands, using a food utility index for cattle (*Bos Taurus*). Results indicate that there are relatively more low yield parts, reflecting low status. This test of the model demonstrates that food utility indices in conjunction with other contextual data can be used to identify socioeconomic status.

Tryon, Christian (Harvard University), Nick Blegen (Harvard University) and Tyler Faith (University of Queensland)

[389] *The Scatter between the Patches: A Tephrostratigraphic Approach to Low-Density Archaeological Sites in the Eastern Lake Victoria Basin of Kenya*

Among recent groups, foraging activities are unevenly distributed across the landscape. Archaeological traces of past foragers are also spatially variable as a result of multiple factors, including the redundancy of site use, a bias toward tasks that leave well-defined material traces likely to preserve into the present (e.g., stone tool manufacture), and local sedimentological factors that mediate site preservation through burial as well as subsequent recovery through erosion or excavation. Landscape-scale studies of past foragers do not provide ethnographic snapshots of the past, but rather recognize and use the time-averaged nature of the record. Widespread deposits of volcanic ash, or tephra, are particularly useful in this context, particularly as stratigraphic markers. As the products of a single eruption, tephra are chemically distinct, amenable to direct chronometric dating and can bury paleolandscapes as well as surface and subsurface archaeological and paleontological sites. We use multiple widespread Late Pleistocene tephra deposits exposed in outcrops around the eastern margin of Lake Victoria to constrain and guide our examination of spatial variability in Middle Stone Age artifacts, fossil fauna, and depositional environments in a region that, while dominated by the largest lake in Africa today, was an expansive grassland in the past.

Tryon, Christian [371] see Niespolo, Elizabeth

Tsang, Chenghwa [36] see Cruz Berrocal, Maria

Tserendagva, Yadmaa [360] see Farquhar, Jennifer

Tsesmeli, Evangelia (Southern Methodist University) and David Eck (New Mexico State Land Office)

[366] *Eligible Recommended Archaeological Sites? Biases and Caveats: A View from New Mexico*

Eligibility of an archaeological site in the National Register is determined on four basic criteria. This research discusses the nature of eligible nominated sites in regard to their temporal and spatial affiliation on New Mexico State Trust Lands as they are recorded in the New Mexico ARMS database. Correlations with available archaeological surveys, terrain visibility, and the way we regard and define what an archaeological site is are also examined.

Tsouras, Theodore (Logan Simpson), Michael L. Terlep (Logan Simpson), David Lewandowski (Logan Simpson) and Wesley Gibson (Logan Simpson)

[301] *The Site as a Moving Target: 40 Years of Change on the Dynamic Landscape of Black Mesa*

In the context of surface archaeological inventory, sites are typically regarded as static entities about which numerous inferences can be made regarding function, temporal affiliation, and potential for subsurface deposits. These inferences are often the primary tool used to inform National Register of Historic Places eligibility recommendations, as well as guide testing and/or data recovery strategies ahead of various development or other federal undertakings. In many regional areas and with many site types, this process can be more or less straightforward. In areas subject to intense erosion and/or deposition, and with certain site types—specifically, small artifact scatters—the process can become more complicated. Comparing previous survey and testing data from the Black Mesa Archaeological Project (BMAP) conducted between 1967 and 1983 with almost 4,000 acres of recent survey by Logan Simpson of the same area, this poster examines the effects of approximately 40 years of erosion and deposition on the surface manifestation of small artifact scatters on Northern Black Mesa, Arizona.

Tsouras, Theodore [155] see Lewandowski, David

Tsui, Jamie and Liye Xie (University of Toronto)

[91] *Quantitative Use-Wear Analysis with ImageJ*

Traditional use-wear analysis is mostly subjective and requires considerable experience. Researchers have tried image analyzing software to quantify use-wear patterns; however, the cost of software and the lack of training to use the software made common adoption of the approach less practical. In this research, we tested the open-source software ImageJ for use-wear measurement in two-dimensional images. The results show that the software can reliably quantify the polish development, the polish microtopography, and the dimensions and numbers of worn areas in image samples taken from both experimental and archaeological specimens. Compared to the software previously employed in two-dimensional quantitative use-wear analysis, ImageJ has the advantage of being a free, public domain software which also allows developers around the world to create plug-ins to meet specific research needs. With this software, it is now possible to popularize quantitative use-wear analysis, even for the use-wear images taken in past, traditional use-wear projects.

Tsutaya, Takumi (Kyoto University)

[330] *Feeding Ecology of the Okhotsk Hunter-Gather-Fishers Estimated by Stable Isotope Analysis*

Hamanaka-2 site in the Rebun Island, Hokkaido, Japan, provides a good faunal assemblage made by Epi-Jomon and Okhotsk hunter-gatherer-fishers. In this study, we reconstruct feeding ecology of the Okhotsk hunter-gatherer-fishers by applying the stable carbon and nitrogen isotope analysis to faunal and human remains from the Hamanaka-2 site. As a result of the analysis, Okhotsk humans were at the highest trophic level among the mammals, domesticated dogs indicated the similar but slightly lower isotope ratios with humans, and domesticated pigs indicated the varying isotope ratios between marine and terrestrial endpoints. Isotopic mixing model suggested that the main protein sources of the Okhotsk humans are dogs and marine mammals, those of the domesticated dogs are marine mammals and fishes, and those of the domesticated pigs are C3 terrestrial and marine food sources. Although the dogs indicated no chronological change in the isotope ratios, the carbon and nitrogen isotope ratios of the pigs appeared to increase through the time. The results of this study will provide a new insight into the feeding adaptation of ancient northern hunter-gatherer-fishers to subsist in the island environment.

[30] *Discussant*

Tucker, Carrie, Nelda I. Marengo (University of California, Riverside), Ashuni E. Romero Butrón (E. Nacional de Antropología e Historia), Dominique Rissolo (University of California, San Diego) and Jeffrey B. Glover (Georgia State University)

[44] *Vista Alegre: Recent Excavations of an Ancient Maya Port Site along the North Coast of Quintana Roo, Mexico*

The Proyecto Costa Escondida (PCE) has undertaken investigations along the north coast of Quintana Roo, Mexico, since 2006. In this paper we present results of the 2016 field season, which was focused on the small island port site of Vista Alegre. The 2016 field season at the site had two main objectives. One was to document the extent and scale of human modification at Vista Alegre. The second was to investigate distinct architectural groups at the site to better understand their chronology. To meet the first objective, an E/W transect of 1 m × 1 m test units was excavated providing a view of the island in profile. The second goal was met by placing excavations into three platforms at the site. The architectural characteristics documented

allows us to investigate the similarities and differences between these architectural groups, such as: their orientation, method of construction, materials used, and how they were finished. In short, this field season provides a better understanding of the site's chronology and how Vista Alegre's inhabitants interacted with other parts of the Maya world from the Middle Preclassic through the Postclassic.

Tucker, Gregory (University of Michigan)
[312] *Discussant*

Tuna, Numan [240] see Daniels, Megan

Tune, Jesse (Department of Anthropology, Fort Lewis College), Heather L. Smith (Department of Anthropology, Eastern New Mexico University) and Stephen Yerka (Department of Anthropology, University of Tennessee)

[184] *Younger Dryas Fluted Technologies: A Comparison of Folsom, Cumberland, and Barnes Technologies*

The transition from Clovis fluting techniques to the variety of later Paleoindian fluting methods and fluted-point morphologies represents one of the earliest major technological shifts currently known in North America. This transition generally coincides with the beginning of the Younger Dryas, and much speculation exists concerning potential correlations between changes in environmental factors and Paleoindian technologies. Some researchers argue that late Pleistocene ecological transitions and subsequent variation in fluted-point technologies demonstrate early stages of cultural regionalization as people began to adapt to local environments. In turn, this regionalization led to the emergence of "full-fluted" technologies during the Younger Dryas such as Folsom in the Great Plains, Cumberland in the Midsouth, and Barnes in the Great Lakes regions. Here, we present an assessment of morphological and technological attributes observed on samples of Folsom, Cumberland, and Barnes points to identify degrees of homogeneity in technological traits. Discussion will address the potential for historical relatedness, regionalization, and independent invention, as well as correlations with Younger-Dryas era environmental proxies.

Tung, Burcu (Catalhöyük Research Project)

[73] *Excavation Narratives and Reflexive Practices at Çatalhöyük*

A microcosm in itself, The Çatalhöyük Research Project has, in one way or another, intellectually, emotionally and physically altered the lives of its members. The project ethos, in turn, has changed through time with the dynamics that surround research and managerial practices of the individuals making its body. Further the project has been part of a local landscape enduring sociopolitical changes within Turkey. As a member of the Çatalhöyük Research Project since 1997, in this paper, I reflect on the practicalities of the Project's reflexive excavation methodologies. I explore the different narratives that have structured the excavation methodologies of the different teams engaged in the project. I bring my perspective, as a female Turkish archaeologist, to the challenges that have been faced, the opportunities that may have been missed, and the accomplishments that have been made in lieu of the competing expectations held by different team members.

Tung, Tiffany A. (Vanderbilt University, Department of Anthropology)

[364] *Documenting the Forced Migration of Enslaved Peoples at the Grassmere Plantation, Nashville, Tennessee, Using Strontium and Lead Isotope Analyses*

The Grassmere Plantation in Nashville, Tennessee was established in 1810, and documents show that unnamed, enslaved peoples labored there throughout the decades until emancipation. Our research investigates whether enslaved laborers were born and raised on the plantation or were forcibly moved there later in their lives. To address that question, we analyzed strontium and lead isotope ratios from tooth enamel. Twenty burials were recovered from Grassmere, and we obtained strontium and lead isotope ratios from 12 teeth representing 10 of those individuals. The strontium isotope ratios range from 0.70963 to 0.71303 and the mean $87\text{Sr}/86\text{Sr} = 0.71097$. For lead isotopes, the $206\text{Pb}/204\text{Pb}$ range is 18.4 to 21.5 (mean = 20.3); $207\text{Pb}/204\text{Pb}$ range is 15.6 to 15.9 (mean = 15.8); and $208\text{Pb}/204\text{Pb}$ ranges from 38.4 to 41.1 (mean = 40). Independent verification of local strontium and anthropogenic lead ratios remains to be determined; however, the observed range and cluster of these data strongly suggest there were two, perhaps three, different geographical origins represented by the 10 individuals. This is consistent with oxygen isotope data, with $\delta^{18}\text{O}$ values that range from -2.6 to -6.1. Together, the isotope data suggest that several of the individuals were probably purchased at slave markets later in life and forcibly relocated to Grassmere.

[147] *Discussant*

Tung, Tiffany A. [143] see Poulson, Simon

Turmubaatar, Tuvshinjargal [114] see Barton, Loukas

Turner, Andrew D. (Yale University) and Rex Koontz (University of Houston)

[179] *The Late Classic Ballgame and Cross-Cultural Interaction at Xochicalco, El Tajín, and Copán*

The proliferation of ball courts at major sites such as El Tajín and Xochicalco during the Late Classic period suggests that the Mesoamerican ballgame and its associated architectural features played a crucial role in the expression of power and identity in the tumultuous centuries that followed the collapse of Teotihuacán. This paper investigates the role of Late Classic ball courts in fostering, shaping, and manifesting cross-cultural interaction through focus on sites from three different regions: Xochicalco in Central Mexico, El Tajín on the Gulf Coast, and Copán in the Southern Maya Lowlands. While several earlier scholars have noted distinct similarities in ballgame art and architecture shared among these sites, they have been hesitant to explain how and why such features should be shared across vast distances. As focal points of public ritual and spectacle, ball courts served as spaces that mediated cross-cultural interaction, and may have been constructed in part to impress visiting dignitaries or merchants from distant allied or rival polities. Likewise, similarities in ballgame architecture and associated artistic embellishment could signal mutual affiliation to foreign visitors, and thus may have been prone to emulation among different cities.

Turner, Michelle (Binghamton University) and Ruth Van Dyke (Binghamton University)

[373] *The Archaeology of Aztec North*

Our paper reports on our recent archaeological testing at the previously unexcavated Aztec North great house at Aztec Ruins National Monument. Standing on the river terrace behind and above the better-known valley great houses, Aztec North is out of sight of those great houses but tightly bound to them as part of the formalized cultural landscape of Aztec Ruins. It is a crucial site for understanding the development of Chaco Canyon's outliers, as it was likely the earliest great house built in what eventually became the enormously ambitious outlier complex of Aztec Ruins. Our investigations

revealed architectural surprises, including unexpected construction methods that bring into question archaeologists' traditional dichotomies between Chacoan building methods and methods of local emulation. And even as the site revealed little evidence for intensive use, we found signs of significant remodeling. Our artifact analysis is also adding to our understandings of the site's chronology, of the use of materials from near and far, and of subsistence practices at this site. We will discuss our results, drawing on broader understandings of Chacoan expansion, and with consideration of how Aztec North relates to the greater cultural landscape of Aztec Ruins, to Chaco Canyon and to other regions.

Turner, Nancy [77] see Armstrong, Chelsey Geralda

Turner, Nancy J. [77] see Jackley, Julia

Turney, Kathryn (University of Arizona)

[106] *Oral History and Ethnoarchaeology at Wupatki National Monument*

The history between the Wupatki Basin Navajo, the National Park Service, and various local ranchers has resulted in the Navajo being driven from this part of their ancestral homelands. The results led to loss of land and connection to family members, some of whom were driven across the Little Colorado River and formed new settlements. My research this summer has been to chart the genealogy of the Wupatki Navajo and extended family, visit Navajo sites within the Flagstaff National Monuments and employ spatial analysis of family dwellings and sheep herding areas within the park. I want to generate a better understanding of the importance of land use and loss and how it is related to the Navajo philosophy of K'e and K'ei.'

Tushingham, Shannon (Washington State University) and Robert Bettinger (UC Davis)

[383] *Diversity and Development of Property Rights and Money in the Southern Pacific Northwest Coast*

At contact, property rights systems in northwestern California and southwestern Oregon were complex and diverse, and applied to a wide range of sacred places and items as well as use rights to foods and materials associated with a highly productive (yet very patchy) resource base. Use rights and possession extended from property that was commonly owned (e.g., game, line fishing locations) to individually owned property (e.g., productive salmon weir locations and acorn groves, dance rights, formulae). Individually owned items were easily negotiated with money, while other property less so. Despite similarities with the northern/central NWC, resource privatization was the norm, and household production remained on the family level operating within the "sweathouse group." Property rights and human-environmental relationships changed fundamentally at 1300 BP when plank house villages spread throughout the region. This time is characterized by a rapid, qualitative shift in adaptive strategies—including an expansion in diet that included back loaded staples (e.g., salmon) in addition to previously intensified front-loaded foods (e.g., acorns)—and likely involved an expansion and/or formalization of money use, resource privatization, and individually negotiated items.

Tushingham, Shannon [173] see Buonasera, Tammy

Tuvshinjargal, Tumurbaatar [114] see Case, Nicholas

Tykot, Robert H. (U. of South Florida), Kyle Freund (Indian River State College) and Andrea Vianello

[178] *The Social Dynamics of Obsidian Use in the Prehistoric Western Mediterranean: Temporal Changes in Maritime Capabilities, Lithic Technology, and Sociopolitical Complexity*

In the western Mediterranean, obsidian was an important lithic material, coming from four Italian islands and found at archaeological sites up to several hundred kilometers away. Analytical studies of many thousands of artifacts have identified their specific geological sources, and revealed chronological and geographic changes in their selective use through the Neolithic and Bronze Ages (ca. 6000–1000 BC). These data are used to assess economic and social dynamics regarding access to and territorial control of the sources, and the production and distribution of obsidian cores and tools. We specifically compare the social dynamics of obsidian usage from the large island of Sardinia with that of the small island of Lipari, for several time periods. Elemental analysis of artifacts and identification of specific geological subsources for each island is well established, while the use of a nondestructive portable XRF in museums and other facilities over the last decade has tremendously expanded the number of artifacts tested. The variables addressed include the quality, quantity, and accessibility of the raw material; technological developments and specialization in lithic artifact production; and socioeconomic changes from early farmers in the Neolithic to complex societies in the Bronze Age.

Tynan, Justine [196] see Duffy, Paul R.

Tys, Dries [282] see Leonard, Alison

Uceda, Santiago, Henry Gayoso (Proyecto Arqueologico Huaca de la Luna—UNT), Feren Castillo (Proyecto Arqueologico Huaca de la Luna—UNT), Enrique Zavaleta (Proyecto Arqueologico Huaca de la Luna—UNT) and Carlos Rengifo (Proyecto Arqueologico Huaca de la Luna—UNT)

[170] *Los cambios climáticos y sociales una ecuación positiva: Los datos en el complejo arqueológico de Huacas del Sol y de la Luna*

Los antiguos estudios sobre la cultura Moche, o Mochica, consideraban que un mega Niño (550–600 dC) fue la causa del abandono del sitio y el traslado de la capital Moche a Galindo. Los datos recuperados en los últimos 25 años en el complejo arqueológico Huacas del Sol y de la Luna ofrecen una secuencia ocupacional casi continua desde el siglo I dC hasta el siglo XIV. Durante este tiempo se han identificado tres grandes periodos: los dos primeros corresponden a la ocupación Moche y el tercero post-Mochica. Un cambio brusco en la estructura social y política Moche hacia el siglo VII se registra en asociación con el abandono del Templo Viejo de Huaca de la Luna y la construcción de un nuevo edificio, aunque menos imponente. Al mismo tiempo y contemporáneo con el Templo Nuevo, la Huaca del Sol pasa de ser una importante residencia a un verdadero palacio. En base a esta evidencia, este trabajo explora una reinterpretación del impacto del fenómeno El Niño, en contraposición a las hipótesis propuestas en la década de 1970, muchas de ellas aún persistentes.

Uchiyama, Junzo [371] see Gillam, Christopher

Ueda, Kaoru (Boston University) and Ellen Hsieh (UCLA)

[36] *Navigating through Asian Waters: Comparative Study of Seventeenth- and Eighteenth-Century Porcelain Trade in Manila, the Philippines, and Banten, Indonesia, from an Archaeological Perspective*

The trade networks in seventeenth- and eighteenth-century Southeast Asia are often reconstructed by using European historical sources. As a result, Southeast Asia is frequently portrayed as a way station between Europe and China. However, the comparative study presented here between Ayuntamiento the Spanish government site in Manila, the Philippines, and indigenous palace sites in Banten, Java, Indonesia, under Dutch indirect rule suggests a far more complex picture and challenges the traditional understanding of the Euro-Asian porcelain trade as well as the Eurocentric power relationships in early modern Asia. The results of our study unveil the strong presence of Chinese merchants' activities among the regional maritime networks. A sizable amount of Japanese trade porcelain found in Ayuntamiento suggests that the privilege bestowed to the Dutch as the sole Western trading partner in Japan was effectively violated by trade through Chinese merchants particularly via Formosa (Taiwan). Moreover, the distinct porcelain distribution patterns between the two indigenous palaces in Banten suggest the dynamic agency of the locals and help fill the gap in an under-documented aspect of Euro-Asian porcelain trade.

Uehlein, Justin [336] see Thurber, Hali

Uesugi, Akinori [167] see Vasantha, Rajesh

Ullah, Isaac (Arizona State University)

[268] *Moderator*

[268] *Discussant*

Ullah, Isaac [191] see Banning, Edward

Ullinger, Jaime [196] see Ramireddy, Pranavi

Ullinger, Jaime [151] see Tarquinio, Daniella

Underhill, Anne P. (Yale University), Fengshi Luan (Shandong University) and Fen Wang (Shandong University)

[76] *Variation in Large Sites from the Longshan Period of Northern China*

Recent research does not support the common view that the numerous large sites from the Longshan period of northern China ca. 2500–1900 BC represent a homogeneous type of settlement with respect to developmental process, scale, and organization. Most publications regard these large settlements as cities and expect they share specific features indicative of organizational homogeneity. The focus has been on large Longshan and later, early Bronze Age settlements in Henan province. We discuss variation in scale and organization of large sites located in the eastern seaboard area of Shandong and northern Jiangsu provinces. On the basis of our collaborative excavation at Liangchengzhen in southeastern Shandong, we argue that a particular challenge for understanding the nature of large Longshan settlements is the need for more extensive excavations and diachronic data revealing changes in scale and organization over time.

Unger, Jiri [189] see Kvetina, Petr

Uomini, Natalie (MPI-SHH, Jena)

[313] *Moderator*

[313] *Discussant*

Ur, Jason (Harvard University)

[76] *Mesopotamian Megasites before Uruk*

Discussions of "alternative" trajectories of urban growth are often compared to "classic" models from Old World civilizations, and most often Mesopotamia. It is said that Mesopotamian cities were dense and spatially discrete from their agricultural hinterlands, in contrast to new models of low-density urbanism. In fact, the earliest large settlement agglomerations ("megasites") in Mesopotamia were discontinuous and far less dense than the mature cities of the Bronze Age (after 3000 BC). This paper describes two such early sites, Tell Brak and Khirbat al-Fakhar (Hamoukar), both of which grew to large spatial (and possibly demographic) scale centuries before Uruk. Rather than seeing them as experiments that failed, this low-density "proto-urban" phase of the late fifth–early fourth millennium BC was on a trajectory toward the classic Mesopotamian urban model, one that archaeologists have failed to recognize due to methods and taphonomic factors.

Urban, Thomas (Cornell University), Linda Chisolm (U.S. National Park Service), Sturt Manning (Cornell University), Jeffrey Rasic (U.S. National Park Service) and Andrew H. Tremayne (U.S. National Park Service)

[257] *Geophysical Investigations of Archaeological Sites in Alaska's National Parks and Preserves: 2016 Field Season*

Alaska's National Parks and Preserves have seen increased use of geophysical methods for cultural resource management and archaeological research in the past several years. Here we describe the results of geophysical surveys conducted at several of Alaska's National Parks and Preserves in the summer of 2016 as part of an ongoing effort that has span several field seasons and has now included eight parks and preserves. Examples from 2016 include research at Gates of the Arctic National Park and Preserve, Bering Land Bridge National Preserve, and Katmai National Park and Preserve. Our results include successful examples of detecting hearths and campfires with magnetic methods as well as detecting and mapping semi-subterranean houses with ground-penetrating radar (GPR). We also test the possibility of using GPR for snow and ice patch archaeology. As resource management and research tools, our work has shown geophysical methods to be highly effect in these contexts.

Urcid, Javier (Brandeis University), Arthur Joyce (University of Colorado, Boulder) and Sarah Barber (University of Central Florida)

[82] *More Carved Monuments from Rio Viejo and their Historical Implications*

The analysis of a dozen recently documented inscribed monuments from the ancient urban center of Rio Viejo, in the Pacific littoral of Oaxaca, provides new insights regarding the historical and political development of the regional capital in the lower drainage of the Rio Verde.

Uriarte Torres, Alejandro (Instituto Nacional de Antropología e Historia)

[215] *Consumo de bienes de prestigio y estrategias políticas: Una propuesta diacrónica para el noroeste de Yucatán en el Preclásico*
Durante el Preclásico, el noroeste de Yucatán atestigua el desarrollo de grupos sociales complejos tempranos evidenciados por la aparición de una jerarquía de asentamientos y una arquitectura de función cívico-ritual. La evidencia arqueológica indica que estos grupos tenían acceso a bienes de intercambio a larga distancia de productos elaborados con diversas materias primas: obsidiana, jade y basalto, por mencionar los que aparecen con mayor frecuencia en contextos arqueológicos. En contraste, existe poca evidencia de la relación entre el consumo de estos bienes y grupos que puedan ser considerados de elite. En este trabajo se explora la relación entre el estatus social expresado en la calidad e inversión de fuerza de trabajo en construcciones residenciales y la distribución de bienes de prestigio, con base de los datos recuperados durante las excavaciones efectuado en los sitios de Caucel, Anicabil, Xaman Susula y Xanila (localizados en la periferia occidental de la ciudad de Mérida, Yucatán). Los resultados obtenidos permiten analizar la relación entre la codificación social de los bienes, acceso a ellos y estrategias políticas económicas, de acuerdo a la teoría acción colectiva, efectuando una propuesta diacrónica desde el Preclásico Medio (1000–450 aC) hasta el inicio del Clásico Temprano (ca. 250 dC).

Uriarte Torres, Alejandro [337] see Flores Esquivel, Fernando C. Atasta

Uribe, Mauricio

[202] *Repensando la verticalidad en tiempos del Inca: El caso de Zapahuira, Sierra de Arica, Norte de Chile*
A mediados de 1970 surgió la conocida discusión si el dominio incaico en el norte de Chile había sido directo o indirecto, a partir de la aplicación que se hizo del modelo sobre la “verticalidad” andina de John Murra. De acuerdo con esta propuesta, la situación se dirimía en términos de que cuán abundante era la materialidad del Inca en los territorios conquistados, especialmente arquitectónica y cerámica, y cuánto ésta se atenía al estilo original del Cusco. De acuerdo con las incipientes investigaciones de aquella época, predominó y mantiene cierta vigencia la hipótesis de la ausencia de una conquista propiamente tal y que más bien se trató de un dominio indirecto sobre la base del sistema ecológico previamente implantado por grupos altiplánicos en tierras bajas. Aprovechamos este simposio para discutir estos planteamientos a través una síntesis y actualización de nuestros estudios en los sitios Tambo y Colcas de Zapahuira, aportando con nuevos datos tecnológicos, estilísticos, funcionales y cronológicos sobre la expansión del Tawantinsuyo en las tierras altas de Arica.

[134] *Chair*

Uribe, Mauricio [134] see Santana Sagredo, Francisca

Urquhart, Lela

[166] *Measuring the Impact of Ancient Colonization in Central-West Sicily*
Studies of ancient colonization in the Mediterranean have principally been concerned with assessing the “impact” of colonization: did the colonization processes of groups like the Greeks and Phoenicians make a significant impact on local native societies among whom they settled, and if so, in what ways? Important as such questions are, they have sometimes overlooked a more basic step: how do we actually measure the “impact of colonization” in the first place? This paper offers a response to that question through the case study of ancient central-western Sicily. It argues that a good way to examine colonial-indigenous interaction is to isolate an aspect of culture that can be a) observed cross-culturally and temporally; b) measured using material correlates; and c) has interpretive salience. For ancient Sicily, religion best fits those criteria. Applying religious correlates to the archaeological record of Sicily between 900–400 BCE reveals important changes. First, colonization catalyzed shifts in the structure and scale of indigenous religion. Second, in terms of “impact,” Greek colonization influenced local religious expression more than Phoenician colonization, particularly after 550 BCE. Third, the perception of this “impact,” however, was due to religious modifications made by all groups—indigenous and colonial—to fit changing sociopolitical circumstances.

Usai, Donatella [219] see Jakob, Tina

Uzawa, Kazuhiro (University of East Asia), Mai Takigami (Yamagata University) and Yuji Seki (National Museum of Ethnology)

[238] *Beginning of Camelid Breeding during the Formative Period at the Pacopampa Site, Peru*
Our research on faunal remains from the Pacopampa and the Kuntur wasi sites has shown that Camelid breeding began during the Late Formative period (800–500 BC) in the northern highlands of Peru. However, motives for the introduction and usage of these animals remain obscure. We conducted multidisciplinary analyses of the camelid remains from the Pacopampa site to investigate breeding and utilization patterns of these animals. The Sr and O isotope values from tooth enamel showed that 17 of 18 camelids from the Late Formative period had been bred and kept for their lifetimes near the sites. Although corresponding data for the Middle Formative period (1200–800 BC) is not available currently, N and C isotope ratios were statistically different from those of the Late Formative period. It suggests Camelids were bred in different areas and then transported to the site during the Middle Formative period. Mortality profiles and pathological observations indicate that camelids had rarely been used as pack animals but were consumed as meat during ritual feasting, used as sacrifice and possibly utilized for their hair. We conclude that camelid dispersal was undertaken in connection with the development of a complex society in the region.

Vacca, Kirsten (University of California, Berkeley)

[19] *The Construction of Archaeological Practice: Sex/Gender and Sexuality on the Fringe*
Archaeologists have incorporated sex/gender and sexuality research in projects for decades, yet such foci have failed to become widespread as they are largely considered a specialty or niche topic. This paper first looks at why the topics in question have remained on the fringe of archaeological research. The subsequent discussion analyzes ways in which contemporary practices can counteract deeply embedded ideas about the archaeology of sex/gender and sexuality, making this approach to the record more accessible to a larger audience. The importance of examining the social constructs in daily life is brought into focus through a discussion of Hawaiian house complexes (kauhale). An analysis of the use of space in Hawaiian kauhale uses the integration of interpretive methods to answer the following questions: How do contemporary theories and methodologies address gender and sexuality archaeologically? How can we best implement interdisciplinary work in answering questions about sex/gender and sexuality constructs? How can we better communicate the legitimacy and importance of this type of research to our colleagues and the general public? The resulting discussion aims to move sex/gender and sexuality research from a niche to mainstream topic that is considered integral to any analysis of social life in the past.

[19] *Chair*

Vadala, Jeffrey (University of Florida) and Jennifer Chmilar (University of Calgary)

[44] *Seasonal Rhythms and Quotidian Duties: Insights into the Impact of Environment on Structuring Daily Life Using El Eden Wetland, Quintana Roo, Mexico, as a Case Study*

All cultural groups must respond to and adapt within their surrounding environment, as was the case for the ancient Maya. The Maya area consists of various distinct ecological zones, from volcanic highlands through swampy bajos and across a dry karstic plain punctuated by wetlands, each providing distinct adaptation opportunities. Seasonal fluctuations provide further texture to the flow of each landscape. This paper explores and attempts to characterize the temporality of the ancient Maya wetland landscape of El Eden, Quintana Roo, Mexico. By temporality, we mean the unique temporal rhythms of the landscape and also social life that organized and guided the interconnected tasks vital to ancient Maya life. To do this, we use a historical ecological approach supplemented by topographic data, 3D simulations, and seasonal photographic data. Our theoretically driven approach allows us to reconstruct and characterize the unique seasonal rhythms found at El Eden and the corresponding tasks that uniquely developed in response to the seasonally fluctuating wetland landscape. By focusing on seasonality, temporality, and tasks, we demonstrate that life at ancient wetlands were organized in a unique manner contrasting but also complementing other modes of ecological adaptation seen in the Maya area.

Vågene, Åshild J. [143] see Bos, Kirsten

Vail, Gabrielle (UNC-Chapel Hill)

[60] *Mesoamerican Spindle Whorls from a Technological and Ideological Perspective*

An important aspect of textile production involves the preparation of fibers, an activity that is represented in the archaeological record from Mesoamerica primarily through the presence of spindle whorls made from a variety of materials, most commonly pottery, but also stone, wood, shell, and gourds. Although occasionally recovered from primary contexts, spindle whorls are more often found in secondary depositions such as burials and caches, or in middens. This paper focuses on spindle whorls from two interrelated perspectives—i.e., the technological aspects that were of importance to the production of different types and grades of cloth, and the ideological aspects suggested by the presence of elaborate incised motifs on mold-made spindle whorls from the northern Maya lowlands, depicting birds, flowers, and other quadripartite motifs, as well as their connection to a series of female deities who have associations with childbirth, fertility, and the life cycle. Our analysis seeks to address both aspects of these important tools and to examine the interplay between them within the context of weaving as a symbolic—as well as a functional—domain.

[60] *Chair*

Valcarce, Ramon

[23] *Chair*

Valcárcel Rojas, Roberto (Faculty of Archaeology, Leiden University) and Menno Hoogland (Faculty of Archaeology, Leiden University)

[395] *European Material Culture in Indigenous Sites in Northeastern Cuba*

Northeastern Cuba, particularly the modern-day province of Holguín, is one of the areas of the Caribbean with the largest number of indigenous sites yielding European objects. In the sixteenth century, most of these sites maintained direct or indirect links with Europeans, while others were transformed into permanent colonial spaces by the Spaniards. The study of European objects found at these sites suggests that some of these items were acquired through exchange or as gifts. However, the largest collections of objects appear to have originally functioned as tools or other items used by both Europeans and Indians for mining and agricultural labor. We believe this pattern was established as a result of a process of conquest and colonization specific to Cuba, during which European colonizers rapidly managed to control the local population, thus limiting the indigenous capacity for negotiation.

Valde-Nowak, Pawel [389] see Ciesla, Magda

Valdes, Alejandro (INAH Michoacán), Lissandra Gonzalez (INAH Michoacán), Mijaely Castañón (INAH Michoacán) and José Luis Punzo (INAH Michoacán)

[12] *Marine Shells and Green Stones as Funerary Objects from Tomb II, Tingambato, Michoacán*

A través de la historia, los rituales y formas de enterrar a los muertos han variado entre grupos culturales y regiones. Mesoamérica y particularmente su área occidente no fueron la excepción. En este territorio se han descubierto tumbas acompañadas de ofrendas desde épocas correspondientes al período Formativo y que, con el paso del tiempo, constituyeron verdaderas tradiciones funerarias. La zona arqueológica de Tingambato se encuentra en el límite sur del poblado que lleva el mismo nombre en el estado de Michoacán. Su topónimo puede derivar de "Tinganio" que en lengua tarasca significa "lugar donde termina el fuego," haciendo referencia a las condiciones geográficas del lugar: donde comienza la Tierra Fría y termina la Tierra Caliente. Fue en este importante sitio donde, en el año de 2011, se descubrió una segunda tumba que contenía los restos de un importante personaje, acompañado de un ajuar funerario compuesto por casi 20,000 elementos elaborados en conchas marinas y piedras verdes.

Valdes, Alejandro [12] see Gonzalez, Lissandra

Valdez, Fred (University of Texas at Austin)

[83] *Origins: Contextualizing the Beginning and Development of the PfBAP*

The introduction of a large-scale regional project in northwest Belize began as a more modest endeavor in northeast Guatemala. How the Programme for Belize Archaeological Project (PfBAP) began, how it has modified through several decades, and what we anticipate as its future are discussed. A brief review of select projects within the PfBAP are mentioned as examples of overall program interests. Importantly, the PfBAP relationships with the Belize Government, local communities, and other entities are also presented.

[83] *Chair*

Valdez, Fred [83] see Luzzadder-Beach, Sheryl

Valdez, Kate

[295] *Discussant*

Valentin, Norma (Instituto Nacional de Antropología e Historia), Gilberto Pérez Roldán (Universidad Autónoma de San Luis Potosí), Erika Lucero Robles Cortés (Proyecto Templo Mayor) and Israel Elizalde Mendez (Proyecto Templo Mayor)

[225] *Technological Analysis of Bone Bloodletting Instruments from the Offerings of the Great Temple of Tenochtitlan*

In the seventh season of excavation at the Templo Mayor Project (2007–2014), 25 bone awls were recovered from offerings found in front of the staircase of the Great Temple of Tenochtitlan. We were able to determine that the bone awls were elaborated from bones of birds and mammals, such as eagle (*Aquila chrysaetos*), jaguar (*Panthera onca*), mountain lion (*Puma concolor*), wolf (*Canis lupus*), and whitetail deer (*Odocoileus virginianus*). The bone awls were recovered from five offerings (120, 121, 126, 141 and 149), of which three were located in places directly associated with goddess Tlaltecuhli and the other two in the Cuauhxicalco. All of them correspond to the sixth construction stage (AD 1486–1502). In the present study we performed a taxonomic identification, typological analysis and manufacturing technique analysis of the recovered bone tools with the purpose of increasing our knowledge of the complex bone industry that the Tenochca Empire had during the government of Ahuizotl.

Valentin, Norma [94] see Velazquez, Adrian

Valentinsson, Signe (Hunter College)

[304] *Early Pottery at Petrified Forest National Park*

Petrified Forest National Park is notable for the diversity of its ceramic assemblages which encompass several major ware groups. The earliest ceramics sequence saw one of the most dramatic shifts in pottery production techniques at any time in the park, from the paddle and anvil, micaceous tempered Adamana Brown Ware, to the coil and scrape, sherds and sand tempered white wares and gray wares that dominate the rest of the park's ceramics assemblages. This poster presents a characterization study of 84 sherds from three major ware types that span the adoption of pottery during Basketmaker II to the emergence of white and gray wares in Pueblo I (AD 600–800). By describing the distinctions in methods and materials of construction among these early wares, it attempts to improve understandings of the beginning of ceramic production and the Basketmaker-Pueblo transition in the park.

Valenzuela, Daniela (Departamento de Antropología, Universidad Alberto Hurtado), Bárbara Cases (Departamento de Antropología, Universidad de Tarap), Persis B. Clarkson (Department of Anthropology, University of Winnipeg), José M. Capriles (Department of Anthropology, Pennsylvania State Uni) and Victoria Castro (Departamento de Antropología, Universidad Alberto)

[134] *Where Are the Camelids? Mobility Models and Caravanning during the Late Intermediate Period (ca. AD 1000–1400) in Northernmost Chile, South Central Andes*

Llamas were one of the most valued animals in the Andes. Their importance has transcended the subsistence sphere as they were not only used as a source of food but also served for medicinal and ritual purposes; their fiber was fundamental for manufacturing textiles, and they were a source of symbolism and “food” for thought and ideologies. Nevertheless, their use as pack animals in exchange caravans has been prominent, stimulating intense mobility and long distance traffic between diverse ecological regions as well as mediating political alliances and social interaction. In this paper we analyze the archaeological evidence of caravan movements available in the lowlands (coast and valleys) of northern Chile and discuss the role played by local populations in the systems of interregional traffic. Until recently, it has been assumed that lowland populations relied on a mixed agro-maritime economy and that caravan transport was a specialization carried out by pastoralists of the Andean highlands. We discuss alternative models of mobility (with and without caravans) for explaining the regional flow of goods and social interaction by emphasizing the diversity of participation strategies that lowland populations exercised.

Valenzuela, Daniela [134] see Gayo, Eugenia M.

Valenzuela-Lamas, Silvia and Ariadna Nieto-Espinet (University of Lleida/CNRS—UMR 5140)

[275] *Ding Dung: Animal Enclosures, Digested Bones, and Where was the Livestock in the Archaeological Site? Evidences from Experimentation and Zooarchaeology from Late Prehistory in the Western Mediterranean*

One of the most intriguing questions in many archaeological sites is to elucidate where the livestock was kept, and which and how many animals were herded. This is particularly compelling in Late Prehistory, when many sites were heavily fortified, and all the space intramuros seemed to be occupied by domestic buildings. Some disciplines, such as micromorphology and palynology, help to answer some of these questions. In this paper, we will provide a perspective from zooarchaeology, which is one of the least explored disciplines to detect where the living animals were. Together with a review of the archaeological and zooarchaeological literature for Late Prehistory in the Western Mediterranean, we will provide the results of a present-day experiment with pig dung. The objective of this experiment is to analyze whether the accumulation of digested bones could testify of the presence of pig enclosures, a hypothesis raised for the Iron Age levels of Althiburos (Tunisia; Portillo et al 2012).

Valese, Immacolata (University of Bologna) and Davide Domenici (University of Bologna)

[283] *The Changing Use of Space in Cahokia's Urban Epicenter: Archaeological Investigations on the Merrell Tract (2011–2016)*

The paper summarizes the results of six field seasons since 2011 by a joint Italian/American archaeological project on the Merrell Tract 300 m west of Monks Mound. The extensive excavations, expanding upon the area of Wittry's 1960 salvage work on Tract 15B, revealed a complex sequence of occupations covering the entire sequence of Cahokia's history spanning the Edelhardt through Sand Prairie phases. Throughout its history the Merrell Tract experienced important changes: first as a domestic area occupied by Emergent Mississippian residential groups; then, during the Cahokian apogee (Lohmann and Stirling phases), it was marked by a sequence of large wooden buildings as part of its transformation into a public space, the West Plaza; finally, it reverted back to a domestic area during the Moorehead and Sand Prairie phases, just before the city's abandonment. The recovered data clarify many aspects of this long occupation, especially those related with the shape of a rather enigmatic Stirling-phase bastioned compound and with the unexpectedly complex Moorehead-phase occupation of the area.

Vallejo-Cáliz, Daniel [329] see Kidder, Barry

Van Alstyne, Benjamin (UNLV)

[368] *3D Modeling the Sites of the Virgin Branch Ancestral Puebloan with Photogrammetry and BIM*

On the Shivwits Plateau, there is scarce information concerning how the Virgin Branch Ancestral Puebloan people constructed their pueblos. This is a result of postdepositional processes that have destroyed much of the building materials. To overcome this hurdle, 3D Building Information Modeling

(BIM) is allowing archaeologists to reconstruct these ancient structures digitally. These digital 3D models output volumetric data that are used to estimate material quantities, labor investments, and to evaluate whether the structures were occupied seasonally or year-round. However, these 3D models can be further enhanced through the method of Photogrammetry, which archaeologists are using to record ancient sites digitally. This method is through stitching photos together and producing a 3D model of the ancient sites. Additionally, Photogrammetry results in a more accurate record than a hand sketched map and is significantly less expensive than lidar. Through the combination of Photogrammetry and BIM, this research is creating a more accurate reconstruction of the ancient pueblo sites.

van Boekel, Dieuwertje [326] see Rice, Shaelyn

Van Buren, Mary (Colorado State University)

[164] *The Environmental Effects of Indigenous Smelting in the Southern Andes: A Look at the Source*

Air pollution caused by preindustrial metal production in the Andes has been reported by scholars using data collected from lake sediments and ice cores. An important source of this pollution, which consists primarily of lead dust, is Potosí, Bolivia, a mining center that produced large quantities of silver during the early colonial period and, perhaps, during prehispanic times as well. This paper examines the environmental effects of indigenous silver production by investigating the operation of huayrachinas, small furnaces that were used to smelt argentiferous ores in Potosí and the surrounding area. Two aspects of production are assessed using data collected during the observation of an individual who continued to use this technology into the twenty-first century: the quantity of charcoal employed in the smelt and the amount of lead that was incorporated into the charge. These variables relate directly to the effects of mineral production on the environment, namely deforestation and lead contamination of the air, water, and soil.

Van Damme, Trevor (UCLA)

[240] *Transport Stirrup Jars in Context: Post-Palatial Politics and Social Resilience in Late Bronze Age Greece*

Entanglement theory highlights the dynamic relationship between actors and the objects they create. Recent application of entanglement theory within the framework of post-collapse societies holds much promise for highlighting the role of human actors as agents of resilience. Following the collapse of the palace system in Late Bronze Age Greece (c. 1200 BCE), there were shifts in the overall settlement pattern as a result of increased mobility and innovative technologies (e.g., iron). Within these post-palatial communities, the household offers a stable framework for understanding actor-object relationships within a contextualized setting. In this paper I discuss the actor-object dialectic with reference to a single vessel type, the transport stirrup jar (TSJ). TSJs were the primary vessel for moving bulk liquid commodities in the Aegean during the palatial period. Their production seems to have been closely tied to palatial interests in managing the production of wine and oil. By examining the find contexts of post-palatial TSJs, as well as discussing developments in form, I demonstrate that a shape previously associated with transport had been completely transformed into a functionally useless, but socially potent showpiece. These observations nuance previous understandings of the eventual disappearance of TSJs from the Mycenaean repertoire.

Van Den Hurk, Youri (University College London)

[378] *Cetacean Exploitation in the Medieval London*

Zooarchaeology aims to reconstruct the relationship between humans and animals based on the bone remains of these animals. However the field is often primarily concerned with (domesticated) terrestrial mammals, frequently neglecting cetaceans. This can be ascribed to the fact that zooarchaeological cetacean remains are often too fragmented for identification and a general lack of extensive cetacean reference collections for comparison, resulting in poor understanding of early human-cetacean relations. Numerous medieval sources mention the exploitation of cetaceans in the United Kingdom, including London. These sources often mention that the exploitation and consumption of cetaceans were restricted to the social elite. London was already a large city in the medieval period and at numerous archaeological sites have cetacean remains been uncovered. These remains are often fragmented and have been neglected and understudied so far. By examining these remains and performing ZooMS (Zooarchaeology by Mass Spectrometry) an attempt will be made to see which species were exploited and whether their consumption was indeed restricted to the social elite, as stated by the medieval sources.

van der Haas, Victoria M. (University of Alberta), Vladimir Ivanovich Bazaliiskii (Irkutsk State University) and Andrzej Weber (University of Alberta/Aix-Marseille University)

[330] *Micro-Sampling Dentine to Reconstruct Life Histories of Holocene Hunter-Gatherers in Siberia*

This paper presents a contemporary method for investigating the dietary history of past peoples using micro-sampling dentine of molars from middle Holocene (~8300–3500 cal BP) hunter-gatherers in the Cis-Baikal region, Siberia. The dentine has been sampled into 1 mm strips and each is analyzed for carbon and nitrogen stable isotope ratios. Each dentine strip represents roughly nine months of developmental life while bones samples typically average over the course of ~10–20 years. Previous geochemical tests demonstrated that during the Early Bronze Age a number of individuals migrated from the north of the Cis-Baikal, the Upper Lena area, toward the coast of Lake Baikal, the Little Sea micro-region. Some hunter-gatherers appear to have retained diets typical of their homeland while in other cases they were abandoned for new local diets. Micro-sampling of dentine allows for a more complete and informative record of human behavior in the Baikal region and a greatly improved temporal resolution of the chemical signatures obtained from human teeth.

Van der Pluijm, Gabriel

[252] *True Potential: A Database on Osteological Material in Nicaragua*

Archaeological research in Nicaragua has yielded an abundance of human osteological material. Excavations at sites like Monkey point on the Caribbean coast and RURD-UNAN in Managua have uncovered impressive and extensive human inhumations. These sites are among the only four sites in Nicaragua where an extensive osteological study has been done and published. Yet many more unpublished literature mentions or has documented osteological remains. What is the real extent of the uncovered osteological material in Nicaragua? What potential lies in the study of this untouched material? This study presents a database compiled of published and unpublished literature that mentioned or studied osteological human remains. The database shows in detail what osteological material is found, if any research has been done on the material and if so what methods were used. Analyzing this database shows that there is indeed an abundance of material that has yet to be studied. Furthermore it shows that there is great need and potential for expanding the science of human osteology in Nicaragua.

van Dijk, Kaz [179] see Donner, Natalia

Van Dommelen, Peter (Brown University)

[166] *Discussant*

Van Dyke, Ruth (Binghamton University)

[20] *Chaco Canyon: Dispersed Settlement, Dialectical Tension, and the Rise of an Ancient Polity in the Southwest United States*

Two dozen monumental buildings lie at the heart of Chaco Canyon, a UNESCO World Heritage site in the southwest United States. However, ancient Chaco Canyon was not a single locality but a focal point for outlier settlements spanning a region of 60,000 square miles. The canyon-outlier relationship is key to understanding the Chacoan polity. Residents of canyon and outlier settlements within a dialectical relationship gathered periodically to share resources, marriage partners, and ritual knowledge. When contradictions within this relationship reached a tipping point, a group of small-scale, dispersed farmers transformed into a centralized, hierarchical rituality where secret ceremonial knowledge legitimated elite political authority.

[157] *Discussant*

Van Dyke, Ruth [373] see Turner, Michelle

Van Gelder, Leslie (Walden University)

[172] *Who Holds Your Light? Revealing Relationships through a Forensic Approach to Upper Paleolithic cave Art*

The study of finger flutings, lines drawn with fingers in the soft surfaces of cave walls and ceilings, allows for the identification of unique individuals within a cave's context. In early years of research we were able to identify men, women, and children in some of the 15 caves which have been studied. These led to discoveries as to which individuals which were often found together in their movement through the caves. The intimacy of cave spaces with artists working side by side, sometimes in very small spaces, and in a variety of combinations of children and adults, males and females, allows us to begin to imagine the embodied experiences and relationships of these people. Through looking at the cave artists with a forensic approach and a relational lens we begin to shine a light on themes of intimacy, cooperation, community and play in the Upper Paleolithic. Finally, this paper considers how our discipline might be radically changed were it to focus research agendas on questions of looking for evidence of intimacy, relationships, and the invisible but powerful impact of the generosity of the human heart in something as simple as holding another's light in a darkened cave.

van Gijn, Annelou (Leiden University) and Matilda Sebire (Leiden University)

[379] *Making Amber Beads: Technological Insights into a Late Neolithic and Bronze Age Craft Activity*

Experimental research of different ways of shaping and perforating amber beads has provided insight into the signatures of different manufacturing techniques and the character of the tools involved. Using stereo and incident light microscopy it was for example possible to distinguish the features from the use of metal tools from the traces resulting from flint implements. Perforating amber with drills made of different raw materials like wood, metal, flint and antler, also show considerable variation in traces, with Micro CT scans further elucidating the exact shape of the perforation and allowing a close scrutiny of the production marks. This knowledge was used to study beads from Late Neolithic and Bronze Age settlements and burials, located in the present-day Netherlands. Late Neolithic coastal settlement sites have shown evidence for large scale production of amber beads, with beads being markedly different technologically from contemporary funerary sites further inland. This observation will be examined from the perspective of craft specialization and identities of the makers and users of these beads. In this paper we will discuss our experimental results and use these findings to better understand the archaeological observations on beads from Late Neolithic and Bronze Age settlement and funerary sites.

van Gijn, Annelou [379] see Guzzo Falci, Catarina

Van Gijsegem, Hendrik (Université de Montréal)

[147] *Discussant*

Van Hagen, Logan (Department of Anthropology, University of Georgia), Kathryn L. Ranhorn (Center for the Advanced Study of Human Paleobiology), Tamara Dogandžic (Department of Human Evolution, Max Planck Institut) and David R. Braun (Center for the Advanced Study of Human Paleobiology)

[153] *Lithic Analysis of GaJ17: A Middle Stone Age Locality in Koobi Fora, Northern Kenya*

The Koobi Fora region in eastern Turkana, northern Kenya, is known for its preservation of Plio-Pleistocene hominin fossils. However, very little is known about the Middle Stone Age (MSA) from this region. Fossil and genetic evidence suggest modern humans originated in eastern Africa ~200ka, adding to the significance of this time period and region. In 2016, we excavated site GaJ17, an MSA site located in Area 104 of Koobi Fora. Here we present lithic analysis of recovered in situ and surface artifacts, building on the work of Alison Kelly (1996). These data points were used to understand the overall lithic technology and how they were affected by taphonomic forces. This research showed differences in raw material composition across the site: igneous rocks are more common in situ, and cryptocrystalline silicates (CCS) were more abundant on the surface. This may represent a disparity in collection method, with differential weathering of surface volcanics leading to over-collection of CCS. Reduction intensity analyses indicate that both were produced in the early stage of reduction. Finally, we document the presence of in situ Levallois technology.

Van Horn, Mark (Pennsylvania State University), Adi Eliyahu (University of Haifa), Naama Yahalom-Mack (Hebrew University of Jerusalem) and Anne E. Killebrew (Pennsylvania State University)

[193] *Reconstructing Phoenician Iron Production at Tel Akko, Israel*

Recent excavations (2010–2016) at the Mediterranean port city of Tel Akko, directed by A.E. Killebrew and M. Artzy, have uncovered abnormally large quantities of iron slag and remnants of iron working spanning the sixth–fourth centuries BCE. This mid-first millennium smithy, which smelted iron on an industrial scale, is the only known iron working facility in the Levant dating to the Persian period, providing an unparalleled opportunity to explore iron production at a Phoenician maritime center. This poster presents the preliminary results of iron ore provenience studies utilizing osmium isotope analysis of iron slags and spatial distribution of slags at Tel Akko using geographic information systems (GIS) to address questions relating to sources of the ore, the reconstruction of the Phoenician iron industry at Tel Akko, and its larger economic role in the Achaemenid Empire.

van Roggen (Paterson), Judith (University of British Columbia Okanagan)

[104] *A Case for Clan: Revisiting Sand Canyon Pueblo*

Archaeobotanical reanalysis of plant remains from the late Pueblo III Mesa Verde site of Sand Canyon Pueblo has yielded pharmacological plants and presence of clans. In this presentation the social organization of the site is explored through mythic and historic relationships recorded in Emergence narratives and ethnography. Plants, art, artifacts, architecture, and disease at Sand Canyon Pueblo provide compelling evidence of Bear clan shamans,

who, through their association with the mythic Elder and Younger Warrior Brother Twins are gifted the ability to diagnose disease. This process is encoded in rock art in the region and documented ethnographically. As the ceremonial father of the Younger Warrior Brother, the Bear clan is a significant source of social, religious, and leadership power that continues to assert influence today. A human skeletal anomaly and bear effigy at Sand Canyon Pueblo is echoed in similar evidence at Pueblo Bonito in Chaco Canyon suggesting considerable time depth to these connections. Sand Canyon Pueblo as “first” evidence for archaeological clans in the northern Southwest also hints at contributing factors in Mesa Verde depopulation and the more visible iconography of the Pueblo IV period.

Van Voorhis, Laura (University of Florida), Valentina Martinez (Florida Atlantic University), Nicole Jastremski (Central Washington University) and John Krigbaum (University of Florida)

[232] *Isotopes of Coastal Ecuador*

A preliminary report is presented on research into the diet, health, and mobility patterns for prehistoric coastal Ecuador, based on an analysis of both modern data and archaeological data from Site 035 Salango. An assessment of dietary habits provides insight into a broad range of societal developments, such as the implementation and timing of maize agriculture. Additional insights are provided by an osteological evaluation of human remains, with a particular focus on evidence of pathologies associated with diet. Establishing whether the individuals were born locally, as well as the geographic place of origin for non-native individuals, yields insight into social and economic aspects from the past. Starting with an isotopic baseline for the coastal region of Ecuador, derived from contemporary water, soil, flora, and fauna samples, together with selected archaeological samples, we can compare the isotopic content of human remains to draw conclusions about the deceased’s diet and residences. Preliminary results are presented based on archaeological samples of four individuals and contemporaneous fauna derived from three distinct tomb burials from the Manteno culture. Individual teeth and bone samples from the same individual are utilized to construct a comprehensive life history to provide insights into patterns of diet and migration.

Van Wandelen, Paul (New Mexico State University)

[107] *Weapons of a Spanish Colonial Road: An Analysis of Arms Found at Paraje San Diego, New Mexico*

The Camino Real de Tierra Adentro served as the main conduit of transportation in New Mexico from 1598 until the 1880s, with continued regional use afterward. Situated in strategic locations along this road were stopping points, called parajes, which travelers used to rest. Parajes are usually described as campsites in literature and less attention is given to the other activities that occurred at these sites. In recent reanalysis of collections from Paraje San Diego, a historical paraje near Las Cruces, New Mexico, a significant number of arms and ammunition have been found ranging from lithics to modern firearms. The notable presence of such materials indicates some of the activities which occurred at these sites. As stopping points along lengthy, well-used roads, these sites were home to food gathering, violence, and target practice, among other uses. This paper will present an analysis of the arms found at Paraje San Diego and discuss when, how, and possibly why they were used by travelers using the paraje. Understanding the wide variety of roles these arms served to travelers on the Camino Real will lead to a better understanding of both paraje sites and their uses, as well as travel along the road.

van Wessel, Jürgen (Headland Archaeology [UK] Ltd)

[294] *Osteo-Grammetry: Using Photographs to Rapidly Model Large Cemeteries in Three Dimensions*

Recent excavations at the nineteenth-century St Peter’s Burial Ground, Blackburn (UK) are the first to demonstrate the immense value of photogrammetry for recording human remains on a large scale. Photogrammetry is the process of using photographs to record objects in a measurable way. Recent developments have made the technique accessible and capable of high levels of detail in both geometry and texture. These attributes make photogrammetry very appealing to archaeologists and it should now be considered part of the standard recording toolbox. This paper presents the initial results of the individual photogrammetric recording of 2,000 burials. Both on-site and post-excavation processes will be discussed, demonstrating why it was by far the most appropriate technique for this type of project. The outputs have enabled a comprehensive re-stratification of the site, visualization of the density and depth of burial plots in 3D, and the spatial plotting of a wide range of osteological, artifactual and demographic datasets. The technique has clear applications on North American sites, where rapid, high-quality recording of human remains and other archaeological material is crucial. This is especially true for rescue archaeology in areas affected by high erosion or development pressure.

Vandam, Ralf (University of Leuven—SUNY Buffalo), Peter F. Biehl (SUNY Buffalo), Patrick T. Willet (SUNY Buffalo) and Jeroen Poblome (University of Leuven)

[371] *Past Communities in the Marginal Landscapes of the Western Taurus Mountains, Southwest Turkey: The First Results of the Dereköy Archaeological Survey Project*

This paper presents the results of a new survey project in the Border Region (southwest Turkey). Previous archaeological research in southwest Turkey has until now mainly focused on the larger fertile lowland areas, which revealed numerous farming settlements from the Neolithic onward and illustrated clear distinctive periods of continuity and collapse in human occupation in these areas. The more marginal areas in the landscape such as remote, high altitude locations, on the other hand, have not been the main area of interest. The new Dereköy Archaeological Survey Project, conducted within the framework of the Sagalassos Project, aims to fill this gap in knowledge by shedding light on how different landscape units were incorporated into the cultural landscape. By investigating the Dereköy highlands we would like to examine how and when past communities used more marginal landscapes, and to provide a window on periods which are currently poorly known in plain areas, such as large parts of the Chalcolithic (5500–3500 BC), the Late Bronze Age (1600–1200 BC), and the so-called Byzantine Dark Age (eighth–tenth centuries AD). The unique archaeological datasets of both low and highlands allow us to paint a more comprehensive picture of the prehistoric cultural landscape in Anatolia.

VanderHoek, Richard

[148] *Discussant*

VanDerwarker, Amber (UCSB)

[174] *Analytical Approaches for Identifying Ritual Contexts*

Paleoethnobotanists continue to push plants into the realm of social archaeology, particularly in terms of examining how plants articulated with ancient ritual practices. The examination of the connection between plants and ritual, however, is not a straightforward process—researchers must first appropriately identify special contexts and/or foods, after which they must attribute meaning to the contexts and events they have identified. This presentation focuses on the first step—identification of ritual plant deposits, using the plant assemblage as the means of definition. I discuss several analytical approaches and quantitative methods for achieving this goal while also highlighting relevant case studies.

VanPool, Christine [155] see Willhite, Brenton

VanPool, Todd (University of Missouri) and Christine VanPool (University of Missouri)

[157] *Traveling to the Horned Serpent's Home: Pilgrimages to Paquimé*

In the thirteenth and fourteenth centuries, a new political and religious capital expanded its influence in the North American Southwest. This settlement, called Paquimé or Casas Grandes, was the focus of pilgrimages that reflected and reinforced the social dominance of the elites living at the community. However, caches of millions of ocean shell, instances of human sacrifice, and other aspects of the archaeological record indicate that Paquimé itself was likely considered a living entity that helped control access to water throughout the region. The pilgrimages consequently reflected and created a reciprocal relationship in which the settlement legitimized the elites living there while the elites reinforced and emphasized the sentient nature of the settlement. The resulting pattern is largely consistent with Southwestern and Mesoamerican perceptions of animated places where human and nonhuman beings negotiated complex relationships within the larger cosmological network. These animated locations were often the focus of pilgrimages, and included living communities, ancestral communities, natural features (e.g., the Zuni pilgrimages to the Salt Lake), and symbolic representations of the heavens.

VanTries, Eden (Indiana University of Pennsylvania)

[89] *An Assessment of Prehistory at Historic Hanna's Town*

Historic Hanna's Town, a colonial settlement in western Pennsylvania, was founded in 1769 and quickly made history by becoming the first county seat west of the Allegheny Mountains in 1773. In 1775, Hanna's Town made history again by signing the Hanna's Town Resolves, stating that they would take action if British tyranny continued. Hanna's Town soon became embroiled in the Revolutionary War and as a result was attacked and set on fire by the British and Seneca. Hanna's Town did not recover from this attack and was dissolved as the county seat. The site was then farmed until 1969 when Westmoreland Historical Society purchased the land and placed it on the National Register of Historic Places. Since, the site has been excavated resulting in the recovery of artifacts from colonial as well as prehistoric periods. Most of the research on the site focused on the colonial period resulting in little information about the prehistoric use of the site. This research project examined the occupation of the site prior to Hanna's Town, by classifying the bifaces recovered from the site by type and raw material to determine the time of occupation and where the material was procured.

VanValkenburgh, Parker (Brown University)

[118] *Site-Seeing: Aeriality, Archaeological Survey, and Objectivity in Coastal Peru*

Far from being mana from the future, aerial imagery has been integral to both the practical and conceptual dimensions of archaeological survey almost from its inception. In this presentation, I argue that aerial photography captured via private and state-funded reconnaissance in the 1930s and 1940s played a transformational role in the emergence of regional approaches in Peru's desert coast in the mid-twentieth century. I discuss how the use of aerial imagery has both enabled and constrained the interpretation of archaeological phenomena and participated in the construction of the objects of archaeological survey—sites, artifacts, and landscapes. I then consider how more recently available products—high resolution, multi-spectral satellite imagery, UAV photography and near-surface remote sensing—participate in the same processes.

[64] *Discussant*

VanValkenburgh, Parker [230] see Cronin, Joseph

Vara, Rachel (University of Texas at San Antonio) and Whitney Lytle (University of Texas at San Antonio)

[43] *How I Spent My Summer Vacation: A Model for Archaeology Camps in Service of Public Outreach*

Public outreach and education has increasingly become an essential component of archaeology. Helping the community become invested in the past can do wonders for perpetuating the archaeological ideals of cultural preservation and conservation. Instilling these values in the younger generation is one of the most effective ways to create a more culturally conscious future. The University of Texas at San Antonio's Center for Archaeological Research aims to meet this goal through their educational outreach program titled "Legacy: Hands on the Past." The Legacy program offers many archaeology based learning opportunities for local students, teachers, and other community members throughout the year. Within this presentation we will highlight one of the longest running methods to connect the past to the present employed by the Legacy program. After years of fine tuning, the Legacy team has developed a highly successful model to create an annual archaeology themed summer camp that couple learning and fun for a holistic experience for students. This paper will outline the model while emphasizing the benefits, challenges, and changes Legacy staff has encountered along the way.

Varga, Virág [196] see Szigeti, Anna

Vargas, Amilcar (University of Barcelona), Margarita Díaz-Andreu (ICREA-University of Barcelona) and César Villalobos (UNAM)

[360] *Local Engagement in UNESCO World Heritage Sites: Mexico as a Case Study*

The "critical importance of involving indigenous, traditional and local communities in the implementation of the [World Heritage] Convention" (World Heritage Committee Decisions 31.COM/13A and 31.COM/13B, 2007) reflects discussions that have been taking place in WH since 1994, and has guided much of UNESCO's efforts regarding these communities in World Heritage Sites since. In 1994 social participation became a requirement in the nomination of new World Heritage Sites and since 2008 it has been expected in their management. However, the extent to which social participation has been implemented is a moot point. Inspired by the "Rapid Ethnographic Assessment Procedures" (REAP) method developed by the U.S. National Park Service (Low 2002), our team has conducted fieldwork to examine the situation in archaeological WH sites in Mexico. Methods used by our team include personal semi-structured interviews, focus groups, participant observation and archival research. We will explain some of the results obtained so far and contextualize them in the social and political processes that have taken place in Mexico in the last two decades.

Varma, Supriya (Jawaharlal Nehru University, New Delhi, India)

[167] *Unsettling a Region: Archaeological Landscapes and Seascapes of Saurashtra, Western India*

The peninsula of Saurashtra is a distinctive physiographical region in western India that is surrounded by the sea on all sides except the east, where it is attached to the mainland of South Asia. This square peninsula, virtually a cul-de-sac, is somewhat isolated when compared to the Gujarat plains that are located to its east. Farmers, pastoralists, crafters and traders have left behind their signatures through settling and unsettling in a region, which is characterized by shallow, unproductive soils, high seasonality, recurrent droughts and crop failures. In my paper, I will explore the region of Saurashtra

to shift focus of archaeological studies from both North India as well as the Indus Valley Civilization. I examine the archaeology of places, sites and non-sites, as mediated by economic, environmental or physical conditions as well as by social and cultural practices of past communities that have inscribed, both intentionally and unintentionally, the landscapes and seascapes of Saurashtra in the period between the third and first millennia BCE. I use of the concept of "trace" to explore the residues of ordinary people that have been inadvertently left behind and now form part of the archaeological contexts.

Varney, R. A. (PaleoResearch Institute, Inc.) and Linda Scott Cummings (PaleoResearch Institute, Inc.)

[275] *Finding Dung on Prehistoric and Historic Landscapes: Sporormiella in the Pollen Record*

Dung fungal spores (*Sporormiella*) live on grazing animal dung and comprise part of the pollen record in landscape studies. Coprophilous fungi such as *Sporormiella* rely on a cyclic process involving herbivore ingestion of spores with foliage; germination of spores following passage through the gut; and mycelial growth within, and eventual sporulation on the surface of drying dung. Often their recovery in stratigraphic profiles is interpreted to represent megafaunal presence, thus enhancing landscape use discussions to include grazing fauna. Stratigraphic records from the American Great Plains beginning with a site in Oklahoma (21,000 BP), then moving to other locations examine faunal presence from the late Pleistocene and early Holocene until modern times. Recovery of dung fungal spores on groundstone suggests processing animal entrails. At the recent end of the time spectrum, dung fungal spores recovered from historic Iowa privies from neighboring properties suggest keeping livestock on some properties.

Varney, R. A. [174] see Scott Cummings, Linda

Vasantha, Rajesh, Abhayan G.S. (Department of Archaeology, University of Kerala, T), Akinori Uesugi (Kansai University, Japan), Ajit Kumar (Department of Archaeology, University of Kerala, T) and Neha Gupta (Memorial University, Canada)

[167] *Current State of Megalithic Research in Kerala, India*

Megalithic studies in Kerala started with the discovery, excavation and publication of burial site at Chattaparamba in Kozhikode district by James Babington in 1819. While a number of archaeological investigations on Megaliths in Kerala have been carried out since then, very few of them document the location, distribution and nature of these monuments. Megalithic burials are highly visible on the landscape and are often subject to excavation, yet, we currently lack an understanding of the society and the people who constructed these monuments. In recent years, large-scale construction projects and rapid growth in house construction throughout Kerala has led to the destruction of large number of Megaliths. In this context, the Department of Archaeology at the University of Kerala in collaboration with the University of Kansai (Japan) and Memorial University (Canada) is preparing a gazetteer of reported Megalithic sites in Kerala. In this paper, we discuss the Kerala Megalithic Gazetteer Project, the available archaeological data, and excavations and explorations undertaken under the project. We present preliminary efforts to better understand the density and distribution pattern of Megaliths in Kerala in relation to their physical and social landscapes.

Vashisth, Meenakshi (M.Phil., University of Delhi)

[167] *A Study of the Archaeological Landscape of Bairat, Jaipur district, Rajasthan*

Bairat is a region located in the present-day Viratnagar tehsil of Jaipur district in Rajasthan. So far it is known for yielding two Ashokan inscriptions in the nineteenth century and being identical with the mythological Viratnagara of Mahabharata. This paper develops a larger understanding of the history of Bairat by studying its material culture which came into light after post-Independence excavations and explorations. To understand the settlement from about seventh century BCE up to third century CE, I carefully examined ceramics in existing archaeological collections and integrated them with surface finds of a new site Khera-ki-Dhani which was discovered during the field surveys. This integration of sources of archaeological information offers insights into the history of Bairat, helping us contextualize the royal Ashokan proclamations while providing perspective view on Bairat through time—as part of the larger narratives from Mauryas to Mughals.

Vaughn, Kevin (UCLA)

[147] *Moderator*

Vaughn, Kevin [308] see Gorman, Alicia

Vázquez López, Verónica (Yaxnohcah Archaeological Project)

[337] *Ritual activity at the Grazia Complex, Yaxnohcah*

Yaxnohcah is located in southern Campeche, Mexico, and had an important occupation from the Middle Preclassic to the Late Classic period (c. 600 BCE–800 CE). The focus of this paper is the Grazia complex, one of the ten major civic-ceremonial groups. Grazia consists of two monumental platforms featuring a triadic group and a ball court. The complex is located about 2 km southwest of the center of the site. Excavations began in 2016, revealing the presence of several constructive phases, including early platforms built with massive stone blocks, as well as the remains of ritual activities. A hearth and a ritual deposit with a triadic layout—a cache vessel surrounded by three stones—might be related to the principle of centrality and creation mythology. In this paper, I discuss the importance of the findings at the Grazia complex in a broader perspective, comparing the new data on ritual activity with other contemporary practices throughout the Maya area. Public rituals seem to be related to the process of social integration and the institutionalization of power in the Preclassic period, in an area which played a crucial role in the consolidation of the Maya political landscape.

[337] *Chair*

Vázquez Pazmiño, Josefina [384] see Stahl, Peter W.

Vega, Enrique [323] see Hendrickson, Mitch

Velasco, Matthew (Cornell University), Loro Qianhui Pi (Vanderbilt University) and Tiffany A. Tung (Vanderbilt University)

[231] *Childhood Diets and Residential Mobility in the Late Intermediate Period, Colca Valley, Peru: A Study of Carbon and Oxygen Isotope Ratios from Dental Apatite*

Around AD 1300 in the Colca Valley of southern Peru, an increasing proportion of elite individuals began to mark themselves as ethnically distinct by elongating the heads of children. This permanent act had far-reaching effects on the livelihoods of modified individuals, especially females, who exhibit more diversified diets in adulthood and experienced lower rates of cranial trauma. The present study complements prior stable isotopic analysis of bone collagen by examining carbon and oxygen isotope ratios from dental carbonate to address two primary research questions: First, did distinct child

feeding and weaning practices contribute to the unique life experiences of modified individuals? Second, were social groups based on ethnic, gender, or kinship identity differentiated by dietary and mobility patterns in early childhood and early adolescence? In particular, the comparison of oxygen isotope ratios from human enamel and local water sources in the Colca Valley will test the hypothesis that residential mobility was an integral aspect of women's participation in the agropastoral economy. Finally, stable isotope variation in the Colca Valley is examined in light of evidence from contemporary regions in the Andes that attest to the dramatic effects of late prehispanic ecological and social changes on childhood diet and health.

Velasco, Ernesto [290] see Casar, Isabel

Velazquez, Adrian and Norma Valentin (INAH)

[94] *Reddish Valuable from Far Away: Spondylus princeps in the Ancient City of Tamtoc*

The ancient city of Tamtoc developed in the Huastec region between 400 BC and the early sixteenth century AD. A great amount of shell objects have been found here, some of them made of freshwater mussels that live in the nearby rivers, while other are made of marine species from the relatively close Gulf of Mexico. Some pieces, nevertheless were made of species from the far way Pacific coast, one of which is the bivalve *Spondylus princeps*. In this paper, the results of the analyses made to the objects made of this shell will be presented. They include the study of their manufacturing techniques and their archaeological contexts of finding. On this basis aspects as the origin of their manufactures and their role as luxury items will be discussed.

Velásquez, Antolín [71] see Barrios, Edy

Velazquez-Castro, Adrian [225] see Zúñiga Arellano, Belem

Veldi, Martti (PhD Candidate)

[158] *Biographical Approach for Evaluating Archaeological Landscapes: A Case Study from Estonia*

Since the 1990s, landscape biography as a research method has diversified. The biographical approach expects a thorough study of a certain region in various fields of landscape research, which span far beyond just geography or archaeology. In contemporary approaches to landscape, the limits of the concept of landscape biography are being explored, but also tested. What exactly is a landscape biography? What does it constitute? Is landscape biography just a narration of a specific defined place on the face of the Earth in a defined period of time or does it have a practical output? Is it possible to tell the future by narrating the past? In addition to the traditional landscape narrative, the scope of the current research concentrates on historic land use around archaeological sites and aims to create a system for assessing the archaeological heritage value of certain micro-regions. The aim of the research is to elaborate practical methodology for detecting the most essential elements of archaeological heritage landscape to create an effective concept for landscape preservation through sustainable development. The paper is illustrated by a case study from Estonia.

[158] *Chair*

Vella, Nicholas [133] see Malone, Caroline

Vellanoweth, René L. [142] see Fonseca Ibarra, Enah Montserrat

Vellanoweth, René L. [371] see Morales, Jessica

Velliky, Elizabeth (Universität Tübingen/University of Western Australia), Martin Porr (Archaeology/Centre for Rock-Art Research and Manag) and Nicholas Conard (Department of Early Prehistory and Quaternary Ec)

[282] *Red Ochre at Hohle Fels, Germany: The Use of Pigment and Space at an Upper Paleolithic Cave Site*

Some of the most informative artifacts regarding early symbolic behaviors in Europe come from Hohle Fels Cave, Germany. Hohle Fels (HF) boasts a detailed Upper Paleolithic sequence, and an extensive array of ochre artifacts. In this project, we systematically investigate the ochre assemblage at HF by quantity, type and modification, and proximity to other archaeological features. The ochre assemblage includes painted limestone pieces, faunal elements, fossils, and potential grindstones with traces of ochre, raw ochre artifacts, and anthropogenically modified ochre pieces. Most un-worked ochre pieces date to the Aurignacian (ca. 44–34 cal. ky BP) layers, where important symbolic artifacts such as the Venus figurine and bone/mammoth ivory flutes were found. Almost all of the modified pieces date to the Gravettian (ca. 27–31 cal. ky BP) and Magdalenian (ca. 12.5–13.5 cal. ky BP). A central part of our investigation assesses whether clear behavioral trends related to ochre manipulation are recognizable throughout the Upper Paleolithic. By analyzing the contexts in which ochre occurs spatially and temporally, we aim to explore in-depth how early humans interacted with and mobilized ochre materials during the Upper Paleolithic at HF, which has implications for understanding early symbolic behaviors throughout Central Europe and beyond.

Venables, Barney [96] see Scott, Ashley

Vences, Gustavo Jaimes [145] see Nieto, Rubén

Venegas de la Torre, Luis Joaquin (Universidad Autónoma de Yucatán)

[349] *La fotografía aérea con dron como una herramienta para el Registro del Patrimonio Histórico de Yucatán*

Desde hace muchos años, la fotografía aérea ha sido de vital importancia para el desarrollo de la arqueología. Hoy en día, su uso es tan común que podríamos considerarla una herramienta elemental dentro del trabajo arqueológico, ya sea en la etapa de registro, excavación o análisis. El surgimiento de los Vehículos Aéreos No Tripulados (UAVs o drones), trajo consigo la capacidad de obtener fotografías aéreas de espacios o elementos específicos en poco tiempo y a bajo costo, generando mayores facilidades en la obtención de imágenes que pueden ser procesadas en diversos programas computacionales, poniendo a nuestro alcance una herramienta innovadora para la investigación arqueológica. De esta manera, la presente ponencia tiene como objetivo mostrar las capacidades y la viabilidad del uso de la fotografía aérea con drones como una herramienta para el registro de la arquitectura histórica de Yucatán. Para ello, se expondrán los resultados obtenidos dentro del proyecto "San Pedro Cholul:

geoarqueología, historia e industrialización de una hacienda henequenera yucateca de principios del siglo XX" llevado a cabo por la Facultad de Ciencias Antropológicas de la Universidad Autónoma de Yucatán.

Venter, Marcie (Murray State University)

[10] *Not So Strange Strangers in a Strange Land?*

Ceramic evidence combined with obsidian and sculptural data from the archaeological site of Matacanela are beginning to paint an unexpected picture of intra- and interregional dynamics in the Early and Middle Classic Tuxtlas region of the southern Gulf lowlands. These data point to an unexpectedly independent political-economic relationship with the nearby center Matacapan, but one that may have been created through elite-alliance networks that differently incorporated Teotihuacán-style symbols into local political strategies. In this poster, we consider existing models for political and economic networks in the Tuxtlas, how those networks differently incorporated foreign styles in political strategies, and how new ceramic evidence, some of which includes recent NAA characterizations, addresses our evolving understanding of Classic period dynamics.

[10] *Chair*

Venter, Marcie [320] see Montero Mejía, Gabriela

Vepretskii, Sergei [298] see Beliaev, Dmitri

Vera Flores, María del Rocío

[10] *El suelo arqueológico como mercancía: Problemas actuales sobre la conservación arqueológica en la Costa del Golfo*

El suelo que sólo sea visto como una mercancía que otorgue seguridad económica y sobre el cuál no se regule su uso, adquiere una mayor complejidad al ser parte, además, de un contexto arqueológico. En este sentido, uno de los principales retos de la arqueología en México es conservar a largo plazo las zonas arqueológicas que la ley refiere y todos aquellos sitios de gran valor y extensión, que son investigados año con año y que requieren de un diseño de conservación como política cultural, acorde con el territorio y la organización política-económica de su región, en este caso la gran región de la Costa del Golfo.

Verano, John [238] see Goepfert, Nicolas

Verdugo, Cristina (University of California, Santa Cruz), Kimberly Zhu (University of California, Santa Cruz) and Lars Fehren-Schmitz (University of California, Santa Cruz)

[386] *Beautiful Virgins and Male War Captives: The Role of Sex Attribution in Ancient Maya Human Sacrifice at Midnight Terror Cave, Belize*
The prurient element in the popular notion of the Maya sacrifice of "beautiful virgins" during the first half of the twentieth century (Frost and Arnold 1909; Willard 1926) appears to have made researchers wary of the topic of gender in study of human sacrifice. The interest in human sacrifice arose in the 1990s at the same time as the formulation of the warfare hypothesis for the collapse of Maya civilization (Demerast 1990) so that models of human sacrifice tended to assume that victims were largely male war captives. In reality, few large skeletal assemblages related to sacrifice exist to provide hard data on the issue. The Midnight Terror Cave assemblage, consisting of more than 10,000 bones, is one of the few. This paper reports on the detailed examination of all the pelvises in the assemblage using osteological and paleogenetic techniques to shed light on the sexual composition of sacrificial victims.

Vermeersch, Pierre [227] see Martindale, Andrew

Vermillion, Rebekah (Morehead State University [Craft Academy]), Miguel Delgado Ku (Centro INAH Yucatán) and Timothy Hare (Morehead State University)

[9] *Mapping and 3D Modeling of a Terminal Postclassic Site in the Northern Yucatán*

During our 2016 field season, we mapped and created 3D models of several sites in the Northern Yucatán that were scheduled for destruction due to highway expansion. We used unmanned aerial vehicles (UAVs/drones) to carry photographic equipment to collect both vertical and oblique photos of the site. The resulting photos were processed in photogrammetric software to generate an orthorectified photo mosaic and a 3D model of the entire area. These products were integrated into a GIS to facilitate analysis. In this poster, we outline the technology and data processing workflow used and display the resulting products for a Terminal Classic settlement. The settlement consists of a large platform on which approximately twelve structures are located. Our map encompasses, the platform, architectural remains visible on the ground surface, and salvage excavations from several structures and into sections of the platform.

Vermillion, Rebekah [336] see Hare, Timothy

Veth, Peter [302] see Manne, Tiina

Viana, Sibeli (PUC Goiás) and Maria Gluchy (Universidade Federal do Rio Grande do Sul, Brazil)

[45] *Technological Variability in the Ancient Holocene in the Central Plateau of Brazil and Border Southwestern Brazil with Uruguay*

We'll present reflections about the technological variability of two regions of Brazil, the Central Plateau and the southern state of Rio Grande do Sul. Both are dated from the ancient Holocene and the results come from techno-functional analysis applied in lithic materials evidenced in sites of these regions. The Central Plateau is characterized by the Itaparica Techno-complex, composed of instruments with silhouette easily identifiable. The technical design allows a standardized hafting and organization of different functional parts. The defined spatial distribution of this material and its rupture with the Middle Holocene indicates that it is a technical phenomenon that does not exist in other sites in South America. In the area of southwestern border of Brazil with Uruguay, archaeological sites in surface and stratigraphy present a significant technical diversity. Technical systems of production were evidenced, and for each of the modes (façonage and débitage) there are different predetermined blanks that correspond or not to specific tools. We present technological diversity witnessed in different areas and specific period, indicating multiple technical behavior where a single model is not enough to explain the occupations.

Vianello, Andrea [178] see Tykot, Robert H.

Vicencio, A. Gabriel (Universidad de las Americas Puebla), Aurelio López Corral (INAH Tlaxcala) and Mari Carmen Serra Puche (UNAM)
[88] *Late Formative Obsidian Procurement in Xochitecatl-Cacaxtla*

This study inquires into the obsidian commercial networks of Late Formative in the site of Xochitecatl-Cacaxtla employing an analysis of pXRF on 102 pieces of obsidian artifacts. In addition, we performed a technological approach of the material recovered from ceremonial and domestic contexts in order to know in which stage of the process it arrived. With this, we intent to know how each source was represented throughout the site, revealing the internal maneuvers used by two different settlements in order to better understand both intrasite economic relationships and the interregional commercial system between sites within the Tlaxcala region.

Vicencio, A. Gabriel [215] see López Corral, Aurelio

Vidal Elgueta, Alejandra (Universidad SEK), Luis Felipe Hinojosa (Laboratorio de Paleoeología Universidad de Chile) and María Fernanda Pérez (Pontificia Universidad Católica de Chile)

[222] *Human Selection on Maize Size Traits: A Contribution from the Archaeological Record of Tarapacá, Chile, South-Central Andes*
Maize from Andean region has a recognized complex history, involving ecological and human interaction. Today, while Andean maize shows high morphological and low genotypic diversities, the process involved in its production and selection is unclear. In this work we ask how the morphological and genetic diversity of maize has varied through the Formative Period to the present time in Tarapacá Region, northern Chile? To answer this we analyzed thirty morphological traits and eight microsatellites markers over archaeological cobs and kernels (dated circa 500 BC to AD 1400) and 95 modern ears maize derived from primitive races. Our results show, at phenotypic level, significant differences between archaeological and modern cobs/kernels. In contrast, low genetic diversity between samples was found. These results are consistent with a human selection directed to increase corn size during a short period of time.

Vidal Montero, Estefania P. (Fulbright-CONICYT Chile, Department of Anthropology, University of Chicago), Francisco Gallardo (Pontificia Universidad Católica de Chile-ICHS), Benjamín Ballester (Université Paris 1 Panthéon-Sorbonne), Gonzalo Pimentel (Instituto de Investigaciones Arqueológicas y Museo) and José Blanco

[134] *Formative Mobilities: Moving through the Atacama Desert, Northern Chile*
Social spheres are constituted by population movements. Mobility entails not only the circulation of material goods, but of people, collective imaginary, experiences, flows of information, and knowledge. In this paper, we examine multiple types of movements through the Atacama Desert during the Formative Period (ca. 500 BCE–700 CE). Here, mobility required displacements whose variability included pedestrian travels, the movement of large llama caravans, and the use of sea lion-skin rafts to sail along the Pacific Ocean, thus involving different material means and encompassing a wide array of incentives. We offer different case studies that challenge monolithic assumptions about mobility in the south-central Andes, often seen exclusively through the lens of ecological complementarity and primarily driven by economic exchange. We question here the spatial and temporal scale of these displacements—from daily to seasonal, from micro to macro-movements—as well as its motivations, which were prompted by different social commitments (cooperation, the creation political ties, and the livelihood of communities, to name a few). Through these case studies, we approach movement and travel as a way of life, and explore how it was incorporated into the social lives of these groups.

Vidal Montero, Estefania P. [216] see Ballester, Benjamín

Vigano, Claudia [181] see Ferrari, Giada

Villagran, Ximena [153] see Cleghorn, Naomi

Villalobos, César [360] see Vargas, Amilcar

Villalobos Hiriart, José Luis [225] see Gaytán-Caballero, Adriana

Villalpando, Elisa (Instituto Nacional de Antropología e Historia, Sonora)

[84] *Fishes Swimming in the Magdalena River: Villages and Summit Features in the Middle Magdalena Valley, Northwest Sonora*
At the end of the 1990s, Suzanne and Paul Fish conducted a full coverage survey around the regional center Cerro de Trincheras in the middle Magdalena Valley “to clarify the role of the many smaller or secondary trincheras sites within territorial organization” (Fish and Fish 2007:168). Early Ceramic trincheras sites were located 2.5 to 4 km from its nearest neighbor; all suggest multifunctional and residential occupations in the Magdalena valley, and most of them continued in use in the El Cerro Phase (AD 1300–1450). Summit rock rings are the main architectural feature. El Cerro Phase in the middle Magdalena Valley is marked by the occupancy of Cerro de Trincheras; trincheras sites are more numerous and widespread than Early Ceramic sites. El Cerro Phase sites had corrales with a standardized form which denotes replication and institutionalization of specialized functions, creating a network of integrative trincheras nodes that increasingly interlinked populations. The Fishes interpret summit compounds at Sonora and Arizona as ideologically significant features and move into ethnography for plausible frameworks for testing interpretations. I will discuss if summit structures are a trans-regional phenomenon that include concepts taken by Northwest/Southwest societies who incorporate them in their own traditions.

Villanea, Fernando [92] see Monroe, Cara

Villanueva Ruiz, Denia Berenice

[328] *The Registry System Implementation for the Heritage Cultural Protection in Latin America: The Case of Mexico*
Archaeological research, such as other areas of knowledge, has used technology as a worthy work instrument. Therefore, in this paper, I do a review of the different instruments that have been developed, implemented and refined over the years to confront the need to know and appreciate cultural

material with the final objective to control and preserve the national properties. Also, an objective is to present how the rules, agreements and other development normatives have been accomplished through several projects about stocktaking, cataloging and registry, related to knowledge progress of cultural legacy, which every community has, and how this difficult task has given rise to a wide range of ways implemented in different countries with the same objective: To know that they have.

Villarreal, Alessandra (University of Texas, San Antonio)

[43] *Community Archaeology and Ancient Ceramics: Developing an Inclusive Research Design in San Jose Succotz, Belize*

Collaborative archaeology is an approach that promotes the inclusion of modern, indigenous communities in the study of the ancient past. In the Maya area, local communities have recently become more involved with archaeological research at multiple stages, including research design, data collection, and community outreach. At the same time, advances in the qualitative and quantitative study of early ceramics have allowed archaeologists to further elucidate ancient Maya chronology, economy, and sociopolitical structure. A project design which integrates these recent developments emphasizes the incorporation of local community knowledge into the study of ancient Maya ceramics. This paper, which offers a broad overview of the history of collaborative efforts in the Maya region, serves as a preliminary discussion of a collaborative project established with a local, traditional potter in the village of San Jose Succotz, adjacent to the site of Xunantunich, Belize. The knowledge produced by this project will allow local potters to incorporate ancient techniques into their craft and advance archaeological understandings of ancient ceramics. Further, this introduction of inclusivity into the design and execution of research will help ensure that the knowledge produced is accessible to actors who have traditionally been excluded from academic discourse.

Villaseñor-Marchal, Antonio [75] see Deiter, Karissa

Villaverde, Valentín [169] see Real Margalef, Cristina

Villeneuve, Suzanne (University of Toronto)

[197] *Village Aggregation and Early Cultural Developments on the Canadian Plateau: A Case Study from Keatley Creek*

Understanding when and under what conditions aggregation into larger communities with large corporate house organizations, socioeconomic inequalities and specialized ritual structures occurred has been a central theoretical issue in various regions of archaeological investigations. Perhaps the biggest bone of contention in current theorizing is whether these transitions occur when hunter/gatherers accepted claims to privilege on the part of some individuals by consensus to deal with community problems due to environmental stress or population pressure, or whether people were cajoled into participating in systems creating inequality by promises of lucre and a better life. These scenarios contrast the most in terms of the resource conditions under which early cultural developments are expected. Ritual is often invoked in this context as a means of promoting community group solidarity, or to mobilize and justify systems of inequality. Research at Keatley Creek has been investigating these issues through intensive radiocarbon dating and detailed stratigraphic analysis of large house rim midden contexts and ritual structures, combined with GIS modeling of ritual in village or tribal level societies drawing upon ethnographic and archaeological research. Results from this ongoing research offer significant insight to our understanding of early cultural developments among hunter/gatherers.

Villeneuve, Suzanne [258] see Henao, Julian

Vining, Benjamin (University of Arkansas, Fayetteville)

[382] *Satellite Remote Sensing of Archaeological Environmental Change in the Chicama Valley*

As global ecological change becomes a pressing contemporary issue, it's beneficial to also consider how long-term land use histories have affected current ecologies. Using imagery from several multispectral remote sensing satellites and field verification of detected sites, I describe how legacies from archaeological occupations impact modern industrial sugarcane production in the Chicama valley. Occupation sites and agricultural systems, both extant and remnant, continue to influence sugarcane phenological development. These anthropogenic features result from highly localized changes in groundwater and soil water potential, which in turn produce differentials in plant-available essential nutrients and moisture. In many cases, crop losses result. This remote sensing-aided approach further documents many archaeological features unrecorded in prior surveys. Settlement analysis suggests an abrupt coastward shift in populations between the Moche and Lambayeque cultures; dispersal into more, smaller sites; and an increased reliance on anthropogenic ponds (cochas) in the latter period. These shifts may be linked to changes in groundwater hydrology. Modern small-scale farming and wetlands ecology continue to benefit from anthropogenic wetlands originating in the Lambayeque periods. Both findings show the importance of archaeological land use legacies and path dependence on the modern ecological function of the Chicama Valley.

[382] *Chair*

Vinogradov, Nikolai [323] see Hanks, Bryan

Vischak, Deborah (Princeton University)

[269] *Discussant*

Viviano, Carlos [286] see Haas, Randy

Voelker, Judy

[372] *Discussant*

Vogel, Juliette (Dept. of Archaeology & Historic Preservation)

[361] *Discussant*

Vogelaar, Colton (University of Victoria) and Quentin Mackie (University of Victoria)

[49] Coastal Predictive Modeling for Early Period Archaeological Sites in a Landscape subject to Rapidly Changing Sea Levels, Quadra Island, British Columbia

In the Northwest Coast, paleoenvironmental context is essential in the search for late Pleistocene–early Holocene coastal archaeological sites. The dynamic and complex relative sea level history is a key determinant in site discovery. In this presentation I describe how we are using predictive modeling to help overcome the challenges of this dynamic history. This research introduces novel coast-focused variables and methodology to find early period coastal archaeological sites on Quadra Island, British Columbia. Initially, quantitative modeling is used to highlight potential areas for specific temporal and spatial archaeological site types. These highlighted areas are then evaluated by human judgment to include qualitative and subjective aspects of archaeological potential, such as human behavioral models and landform formation processes. Novel variables such as coastal sinuosity and wind fetch serve as proxy indicators for marine biodiversity and coastal exposure respectively, which in turn may be factors related to site location. Presented are preliminary survey results using this predictive modeling theoretical and methodological approach to find early period archaeological sites on Quadra Island.

Vogelaar, Colton [49] see Mackie, Alexander

Volta, Beniamino (University of California, San Diego) and Nikolai Grube (Universität Bonn)**[179] Classic Maya Politics and the Spirit of Place: Controlling Architectural Discourse at Uxul, Campeche, Mexico**

Settlements are both product and site of innumerable, multilayered, and constantly changing interactions between humans and the material world. At any given moment, the quintessence of a place reflects the prevailing meanings that are associated with it. In this sense, quintessence is inextricably linked to power—over discourse, material, and space. This talk explores the role played by political power in defining the character of the Classic Maya settlement of Uxul, Campeche, Mexico. After establishing itself as an important regional center in the Early Classic period, Uxul fell under the control of the Kaan or “Snake-head” dynasty of nearby Calakmul in the first half of the seventh century AD. This talk suggests that the esprit du lieu of Late Classic Uxul was defined by a tension embodied in the built environment of the site. This tension originated from the juxtaposition of “local” places—sites of memory, ritual, and identity—and new public spaces that signaled the incorporation of Uxul into the Calakmul regional state.

Von Baeyer, Madelynn (University of Connecticut)**[274] The People Who Harvest Together, Live Together: Ethnoarchaeological Considerations on a Late Chalcolithic Archaeobotanical Assemblage from Çadır Höyük, Turkey**

This paper presents archaeobotanical data from the Late Chalcolithic (LC) archaeobotanical assemblage at Çadır Höyük, a mounded site on the north-central Anatolian plateau with almost continuous occupation from the Middle Chalcolithic through the Byzantine period. The analysis will focus on both descriptive and quantitative data from samples dating to around 3600 BCE from a communal cooking area at Çadır. It will examine how archaeobotanical analysis can be used as a line of evidence to determine storage patterns at sites, labor organization, and fuel choice using models of plant use developed from ethnographic work. The paper will also discuss how other lines of evidence, like architectural analysis, can inform or can be informed by the archaeobotanical remains.

von Czerniewicz, Maya [210] see Lenssen-Erz, Tilman

von Petzinger, Genevieve (Dept. of Anthropology, University of Victoria)**[175] The Shaman in the Cave? Testing for Entoptic Imagery in Upper Paleolithic Geometric Rock Art**

It has been proposed that much of the rock art of Upper Paleolithic (UP) Europe can be interpreted as the result of shamanistic visions and related spiritual practices (e.g., Lewis-Williams and Dowson 1998; Clottes and Lewis-Williams 2001; Lewis-Williams 2002; Whitley 2005). This theory is based on a combination of analogy with modern hunter-gatherer groups, and recent neuroscience studies on the universality of human physiological response when in a trance state. Specific geometric signs found in UP art are frequently cited in these arguments as evidence of entoptic phenomena—abstract shapes seen during an altered state of consciousness—but what has yet to be explored is whether these particular images appear with a great enough frequency and in the appropriate contexts to verify this claim. This paper will address the question of whether the regularity and co-occurrence of geometric sign types identified as potential entoptic imagery supports the theory that UP art is the product of shamanistic visions.

von Petzinger, Genevieve [175] see Chase, Amy

Vorenhout, Michel [224] see Martens, Vibeke Vandrup

Vrydaghs, Luc, Cristiano Nicosia (CRéA-Patrimoine ULB, Brussels, Belgium), Yannick Devos (CRéA-Patrimoine—ULB, Brussels, Belgium), Alvise Vianello (CNR-IDPA, Padova, Italy) and Christine Pümpin (IPNA Basel, Switzerland)**[275] Dung Management in Medieval and Post-Medieval Brussels (Belgium)**

During archaeological excavations in the center of Brussels (Belgium), often stratigraphic units containing dung—either omnivore-carnivore, including human, or herbivore—have been encountered. A multidisciplinary approach, comprising soil micromorphology, phytolith analysis and parasitology on soil thin sections, chemical analyses, including GC-MS and phosphorus measurements, was adopted to identify and characterize dung remains. In some cases dung was observed as part of the manure added to pre-urban and urban agricultural and horticultural soils. Under other circumstances, we were instead able to identify the very stable where dung was purposely accumulated for later use (“podstal” or “sunken byre”). In one site we observed the accumulation of dung in an area where waste from latrines and houses accumulated. Such contexts provide important insights on dung management practices and on the value of dung in Brussels between the tenth and sixteenth century AD.

Vujevic, Dario [282] see Zaro, Gregory

Wa, Ye (Cotsen Institute of Archaeology, UCLA)**[279] A Vertical Loess Cave Dwelling at Yangganzhai?**

Of all features excavated at the late Neolithic site of Yangganzhai since 2005—including houses, hearths, postholes, kilns, child and adult burials, and ditches—pits features, known by the generic term “huikeng” or “ash pit” in Chinese archaeology, account for about 80%. Detailed studies of such features are important not only because of their sheer number, but also because their contents are often used as criteria for site dating and chronology.

As our excavation of one such feature (H85) shows, understanding their deposit formation as well as the contents of the deposit is essential to deciphering the function of the pits, as well as their relationship to other features found in archaeological contexts. Our study methods include micromorphology, paleobotany, ceramic analysis, and C14 dating of the pit. This approach of the intensive study to one feature has proved to be fruitful and holds promise for future studies in Chinese archaeology.

[279] Chair

Wa, Ye [279] see Fox, Mathew

Waber, Nicholas (UBC)

[91] *Measuring Gesture: Stroke Quantification in Lithic Use-Wear Experiments*

The saying "different strokes for different folks" is a literal truism in the realm of lithic analysis and experimentation where stone tools were and are used by individual people whose tool use gestures vary in any number of ways. Until very recently, experimental archaeologists have largely neglected aspects of gestural variation, such as how much force is applied to a tool's edge, and task-related gestures are most often glossed under the catch-all term "stroke." "Strokes" are counted and then compared to other "strokes," often without any further definition. This poster describes a method for precisely measuring tool edge loading without restricting the tool user's gestural freedom. Using a low-cost, handheld digital force gauge made with open-source hardware and software, it is possible to precisely record and define individual strokes, and relate them to wear observed on experimental lithic tools.

Wady, Megan [319] see Boyd, Matthew

Waggle, Tawnya (Eastern New Mexico University)

[140] *Mobility of Folsom and Late Paleoindian Occupations at the South Bank Portion of Blackwater Draw Locality No. 1*

Research and excavations conducted at the Blackwater Draw Site have largely contributed to our understanding of Paleoindian era life. This study focuses on the lithic artifacts recovered from the South Bank portion of the Blackwater Draw Site to understand the mobility of Folsom and Late Paleoindian occupations. Although there has been extensive fieldwork conducted at the South Bank, the lithic artifacts from these excavations have not been studied as one cohesive assemblage. The entirety of the Folsom and Late Paleoindian assemblages from the South Bank are used to conduct a lithic attribute analysis to identify and compare the mobility of these occupations. This research also spotlights new information concerning South Bank artifacts, much of which is unpublished and unknown to the greater field of archaeology.

Wagner, Mark and Kayeleigh Sharp

[175] *Portable X-ray Fluorescence (pXRF) and Photogrammetric Studies in Illinois Rock Art Research*

Illinois rock art studies conducted in the nineteenth and twentieth centuries typically used drawings, tracings, and print photography to record prehistoric petroglyphs and pictographs. These types of studies have been replaced in recent years by a variety of new methods including digital photography, DSTRETCH enhancement, photogrammetry, pXRF analysis, and other technologies. These new techniques have greatly enhanced our ability to quickly and accurately record rock art sites in comparison to older methods. In this paper we present several case studies that showcase the use of these new methods and their ability to enhance or correct information collected by earlier rock art studies. Of particular relevance are recent (2016) photogrammetric and 3D modeling studies of several large panels containing hundreds of painted and pecked images at the Piney Creek site (11R26), which the senior author (Wagner) recorded in 2001 through the use of tracing, line drawings, and conventional photography. Comparison of the two techniques demonstrates the clear superiority of photogrammetry and 3D imaging in terms of the reduced amount of time and greater level of accuracy in regard to rock art site recording over more conventional approaches.

Wagner, Stephen

[111] *Discussant*

Wahl, David [337] see Hansen, Richard

Wake, Thomas (Cotsen Institute of Archaeology at UCLA), Lana Martin (UCLA) and Tomas Mendizabal (Patronato Panama Viejo)

[370] *Changing Interpretations of the Archaeology of Caribbean Western Panama*

Recent field and laboratory archaeological findings in Bocas del Toro, Panama offer data that changes and amplifies our understanding of the prehistory of the region. Detailed paleoethnobotanical study, further zooarchaeological examination, preliminary ceramic thin-section analysis, and continuing ceramic analysis have all produced results that call in to question entrenched assumptions concerning the timing of settlement, the nature of the subsistence economy, trade, exchange and cultural complexity in the region. Bocas del Toro was settled by at least 2 kya. Its inhabitants consumed maize, a variety of tree crops, a diverse array of animals, and were fully incorporated in the greater Lower Central American Interaction Network as evidenced by the presence of diagnostic ceramics derived from Central Panama all the way to southwest Nicaragua and many places in between.

Walden, John (University of Pittsburgh), Michael Biggie (Los Angeles Maritime Institute), Rafael Guerra (University of New Mexico, Albuquerque) and Julie Hoggarth (Baylor University)

[369] *Investigating the Presence of Neighborhoods in Classic Maya Dispersed Settlement Patterns*

Classic Maya settlement patterns can be characterized as dispersed or "low density." Yet among the dispersed house groups scattered across the landscape, patterns of residential clustering can often be discerned. These settlement clusters likely resulted from an array of different forms of interaction which collectively acted as centripetal forces bringing people together. For this reason, Maya residential clusters probably represent extended corporate groups or neighborhoods. Unlike their nucleated urban counterparts in other early states, Maya dispersed settlement patterns present difficulties when defining cluster membership and determining where to effectively "draw the lines" around possible neighborhoods. This presentation explores ways to better delineate dispersed neighborhoods at a micro-regional level through the application of various spatial analyses which have been traditionally used to discern political boundaries and polity affiliation at a regional scale. These techniques are applied to the hinterland settlement patterns of the Late/Terminal Classic (AD 600–900) Maya polity of Lower Dover, Belize, to investigate the presence of neighborhoods and patterns of interaction between households. The results suggest the presence of several distinct neighborhoods structured around large intermediate elite residential and ceremonial centers.

Walden, John [101] see Ran, Weiyu

Walder, Heather (Michigan State University)

[341] *Compositional Analysis of Copper-Base Metal Artifacts from Michigan*

Compositional analysis of copper-base metal artifacts using portable X-ray fluorescence (pXRF) is an accurate and nondestructive way to identify "protohistoric" European-trade items in early contexts and to assess the continuity of native copper object use on historic-era archaeological sites (Dussubieux and Walder 2015). This poster presents new results from pXRF analysis of artifacts from two late seventeenth century archaeological sites in the Upper Peninsula of Michigan: the Cloudman Site, a protohistoric or Early Historic Anishinaabe/Ojibwe camp on Drummond Island, and the Marquette Mission site, a Tionontate village in close proximity to a Jesuit mission at St. Ignace. Copper-base metal artifacts from feature contexts were selected for analysis on the basis of other potentially temporally or culturally-diagnostic trade items from the same features. Results provide new information on the persistence of native-copper metallurgical practices in colonial contexts and the introduction of smelted-copper trade items at these sites, furthering the understanding of interactions among Native American communities as well as European explorers, traders, and missionaries in this area.

[269] *Moderator*

[269] *Discussant*

Walder-Hoge, Zoe (Simon Fraser University)

[171] *An Ethnoarchaeological Approach to Traditional Farmer Knowledge and Fire Ecology in Eastern Tigray, Northern Ethiopia*

This study will conduct ethnoarchaeological interviews of Eastern Tigray rural consultants on traditional farmer knowledge, risk management and fire ecology. The data will enable the integration of farmer knowledge within an historical ecology framework to understand human-environment interactions taking place during the Pre-Aksumite and Aksumite periods (>800 BCE–CE 700). A previous paleoenvironmental study examined extensive charcoalized wood and burned matter in the region, however an ethnoarchaeological study has yet to be conducted as to farmer's potential use of fire. Interviews will concentrate on Elders and other community members practicing non-mechanized agriculture. The research will focus on human agency in regard to risk management and periods of resource stress, most notably from climate, soil erosion and increasing demographic pressures. Questions will probe the significance of cereals and the importance of crop diversity. The study will also document changes in land use and approaches to crop cultivation. The knowledge gained is intended to further elucidate human-environmental interactions of early complex societies in the Horn of Africa. The results will assist in generating hypotheses on the role of human intervention and decision making in past human-environment interactions.

Walker, Bethany

[285] *Localizing the Imperial Grain Economy in Mamluk Syria: Expressions of Village-Level Initiatives in Fourteenth-Century Transjordan*

How did the medieval Islamic state realize its objectives in natural resource management? How can we distinguish the "hand of the state" from that of local initiatives in land use? This paper is an attempt to evaluate planting and watering strategies, differentiating imperial agro-policies from local practice at the village level. The focus is the intensification and diversification of grain production in fourteenth-century Syria. Grain fields were the most valuable of the agrarian iqta'at (grants of tax revenues) assigned to military and administrative officers; they were the financial underpinning of the medieval Islamic state. The history of grain production is one lens through which to study the development of governance in the Mamluk Sultanate (1250–1517 CE). Tall Hisban in central Jordan, a rural site that physically dominates the grain fields of the Madaba Plains, provides a case in point. Excavations there, integrated with textual and multipronged paleobotanical analyses, are revealing ways that village communities, combining traditional know-how and innovation, came to actualize state programs aimed at maximizing, and guaranteeing reliable, grain yields. Grain production is likewise compared to the sugar industry and market-oriented terrace gardening, which were also impacted by state policy and have left physical and textual traces.

Walker, Cam (Archaeological Investigations Northwest, Inc.)

[121] *Dining Out in the Desert: Results from Protein Residue Analysis at the Azraq Oasis, Jordan*

Excavations at Shishan Marsh 1 (SM-1) have provided evidence of a unique ecosystem, along with faunal remains and over 10,000 artifacts made from local flint dating to approximately 250,000 years ago. Forty-six of these artifacts were selected for residue analysis from stratified, in situ deposits. Extractions from these lithic tools were tested for possible protein residues using the technique of cross-over immunoelectrophoresis (CIEP). The SM-1 artifact extractions were run against eight antisera, informed by the diversity of faunal remains at the site: rhinoceros, camel, deer, duck, horse, goat, bovine, and cat. In total, 17 positive results were obtained: rhinoceros (3), duck (3), horse (5), camel (3), and bovine (3). An overview of the findings, methods, implications, and the demonstrated potential for CIEP to reveal family-specific results of protein residue from deep time will be presented.

Walker, Chester [41] see Pantel, Agamemnon

Walker, Debra (University of Florida)

[337] *The Search for Sierra Red: Discerning Ceramic Diversity at Late Preclassic Yaxnohcah*

The principal ceramic type for the Petén Late Preclassic period, first identified by Edith Ricketson in the 1930s, and dubbed Sierra Red three decades later, has just about the widest distribution of any ceramic type in the Maya lowlands. In particular, the omnipresent simple flaring walled bowl form is virtually synonymous with the period, yet, after five years of excavation at Preclassic Yaxnohcah, Sierra Red remains an elusive minor type. Middle Preclassic Um Phase is well represented as is the Terminal Preclassic Wob Phase. Excluding a population collapse in Late Preclassic Chay Phase, which seems illogical based on massive and continuous construction data, a case can be made for more diversity in Late Preclassic ceramic production than previously recognized. This paper explores the consequences of such a reality in archaeological interpretation of the Late Preclassic era in the Central Karstic Uplands.

Walker, John (UCF Department of Anthropology)

[327] *Inequality and Taskscape in a Precolumbian Agricultural Landscape*

Raised fields and other earthworks, as parts of archaeological landscapes, can be theorized through Ingold's related concepts of taskscape and lines. In the Bolivian Amazon, such earthworks are the physical remains of group or community activities in the precolumbian past. As such, they are both the products of community tasks, and infrastructure, or resources that in turn afford other community tasks. In conjunction with archaeological survey and excavation, mapping of raised fields and other earthworks makes it possible to characterize trends in the precolumbian landscape across an area of about 10,000 km². About 37,000 individual raised fields have been measured, averaging about 0.27 ha each. When fields are grouped according to simple geographic criteria (such as proximity), groups of fields differ in terms of inequality, by area. The Gini coefficient is used to characterize this

inequality, and trends across space are interpreted, in conjunction with results from excavation. Thinking of landscape as both a product of community tasks, or practices, could be useful in understanding similar patterns in the anthropogenic landscape.

Walker, Martin [241] see Colclasure, Cayla

Walker, Samantha

[214] *Empires and Kingdoms: A Comparative Analysis of Settlement Patterns and Social Organization among the Charter States of Southeast Asia (800–1400 CE)*

The settlement component of the Socio-ecological Entanglement in Tropical Societies (SETS) project assesses the availability and quality of evidence for the structure and organization of dispersed urbanism among a sample of pre-industrial societies within the tropics. This paper compares support population distributions and organization among the kingdoms and empires that correspond to the Charter State era (800–1400 CE) in Southeast Asia. Our study area includes the Dai Viet and Cham kingdoms of Vietnam, the Early Siamese kingdom of Thailand, the Mataram, Kedri, Singhasari, and Majapahit kingdoms of Java, the Chola Empire of South India, the Sinhalese Empire of Sri Lanka, the Khmer Empire of Cambodia, and the Burmese Empire of Myanmar. We summarize the theoretical and methodological foundations of this project and present the preliminary insights of our ground surveys. Emphasis is placed upon how the geopolitical extents of these charter states—and their stability and longevity—are the product of integrative socio-ecological features. This offers a multidimensional view of how the integration of variable power relationships, social structures, and ecological circumstances influence the resiliency of urban systems in Southeast Asia.

Wallace, Henry [335] see Lindeman, Michael

Waller, Kyle (University of Missouri) and Adrienne Offenbecker (University of Calgary)

[237] *Bioarchaeological Approaches to Kinship and Social Organization at Paquimé*

Variation in cranial and dental nonmetric traits provides a unique method for investigating prehistoric biological variability at Paquimé, Chihuahua, Mexico. Previous biodistance analyses have demonstrated patterns of long-distance gene flow with both Southwestern and frontier Mesoamerican groups, while stable isotope analyses have suggested a pattern of immigration into the site. The primary goal of this study is to determine what the pattern of biological variability tells us about social organization and kinship at the site. To test this question, we perform a series of biodistance analyses. First, determinant ratio analyses demonstrate that females have considerably greater genetic variability than males, possibly suggesting a pattern of patrilocality. Second, we use established family clusters as subgroups, and then compare distance between graves and interindividual biological similarity to test the degree to which locales within Paquimé reflect biological lineages. The results do not demonstrate a consistent pattern: some family clusters appear to reflect multiple generations of lineages, while others reflect a broader range of biological variability. We consider the implications of our biodistance results for evaluating models of the growth and development of leadership at Paquimé.

[237] *Chair*

Waller, Kyle [237] see Offenbecker, Adrienne

Walley, Meghan

[318] *Queering the Inuit Past: Archaeology as LGBTQ Allyship*

The real-world utility of academic archaeology is frequently called into question. I address this perception by demonstrating that archaeology has unique potential in the sphere of LGBTQ activism. Because archaeology deals in constructing past narratives, it has the discursive power to naturalize or denaturalize existing social structures and identities. While archaeology has a long history of reinforcing normative social categories, archaeologists have recently begun to apply queer theory, which aims to dismantle normative categories, to their interpretations of the past. I argue that if we practice archaeology with the goal of revealing inconsistencies between past and present social norms, rather than projecting normative categories onto the past, archaeology gains the power to legitimize the identities of people living outside of the norms of their society or community. Through an investigation of nonbinary gender as a traditional aspect of Inuit shamanic identity, I have spoken with members of the Inuit LGBTQ community in order to understand how presenting a queer version of the past impacts living people. The results express the possibility and need to investigate queer pasts to gain a fuller picture of past identities and give LGBTQ communities a sense of history grounded in archaeological research.

[318] *Chair*

Walling, Stanley (Community College of Philadelphia), Travis Cornish (SWCA Environmental Consultants), Chance Coughenour (Institute for Photogrammetry, University of Stuttgart), Jonathan Hanna (Pennsylvania State University) and Christine Taylor (Rio Bravo Archaeological Survey)

[83] *Commoner Landscape, Ritual, and Symbolism in the Shadow of Dos Hombres: Recent Investigations at the Site of Chawak But'o'ob.*

A number of seasons of research at the site of Chawak But'o'ob in the southwestern outskirts of the city of Dos Hombres have revealed an architecturally humble community characterized by dense habitation and extensive landscape modification as well as domestic and public ritual. The evidence suggests that the inhabitants of this farming community had an eye toward symbolism in decisions they made about the disposition of domestic and public structures as well as the manipulation of water and soils. The archaeological investigation of this site, which among other things, includes a ball court complex, suggests that meticulous examination of relic lowland agrarian settlement has the potential to reveal evidence for unexpectedly complex systems of meaning among the non-literate members of Maya culture.

Wallis, Neill [278] see Pluckhahn, Thomas

Wallman, Diane (University of South Florida)

[317] *Subsistence Economies at Morne Patate: A Zooarchaeological Analysis of a Colonial Plantation Landscape in Dominica*

From the seventeenth through twentieth centuries, the Caribbean region experienced unprecedented demographic and environmental change, with the rise and fall of sugar monoculture and the institution of chattel slavery. These transformations were a result of power imbalances at many scales, and the economic, ecological and social consequences of the migrations and interactions were significant and long-lasting. During the Colonial Period, enslaved communities developed diverse socio-ecological practices to survive and adapt within the oppressive plantation structure, through the establishment of artisanal economies and creative subsistence strategies. Zooarchaeological data provide insight into these localized histories and offer important perspectives on the human-ecodynamics of plantation landscapes. This paper presents the results of the analysis of faunal remains from the site of

Morne Patate, a colonial plantation in Soufriere, Dominica. As a colony, Dominica was known for its difficult terrain, absentee land owners, and its positioning as a locus of conflict between colonial empires. Through an investigation of the subsistence-based practices developed by the enslaved laborers and habitants of the plantation, Morne Patate provides a unique case study to explore the socio-ecological dimension of this contentious political and social setting.

Walls, Matthew (University of Calgary), Pauline Knudsen and Frederik Larsen (Ilisimatusarfik/University of Greenland, Nuuk)

[144] *Revisiting the Morris Bay Kayak: Analysis and Implications for Inughuit Hunting Practices before the Nineteenth Century*

The Morris Bay Kayak is a unique assemblage that consists of kayak fragments and associated hunting equipment that was discovered in 1921 by chance in Washington Land, northwest Greenland. This paper documents results from a collaborative project with the Greenland National Museum to reanalyze and date the Morris Bay Kayak, and to consider how it fits in the current perspectives on Inughuit archaeology. Working with the traditional kayaking community in Greenland, the project reconstructed the kayak's frame and life history, and then modeled the skills through which it would have been used. Comparisons of structural fragments and hunting tools with regional assemblages, along with new AMS radiocarbon dates, suggests that the kayak represents a local tradition of kayaking that was practiced until shortly before the colonial period. This paper will discuss what open water kayak hunting implies about Inughuit subsistence, and the sudden loss of the technology before John Ross's arrival in 1818.

[314] *Discussant*

Wallsmith, Debbie and Jeff Mummert (HistoriQuest LLC)

[189] *Archaeology and Augmented Reality: Applications and Advice*

Digital technology has made archaeological sites and artifacts much more accessible to the general public. Augmented reality (AR) allows visitors to "handle" artifacts and view archaeological features in their exact locations even after the units have been backfilled. Implementation of AR comes at a cost; not just in the planning process but long after the site has been backfilled, the artifacts analyzed and conserved, and the site report written. The discussion will focus on an archaeological project in south central Georgia. Camp Lawton (a.k.a. Millen) was a Civil War prison camp built in mid-1864 to relieve overcrowding at the infamous Andersonville. The prison—from conception to abandonment—existed for just six months. Despite the short occupation, excavations have turned up many unique artifacts. Additionally, there are diary accounts and illustrations of Camp Lawton, drawn by a soldier imprisoned there. At the site's museum, visitors can handle 3D artifacts and see a drawing of the fort stockade in its exact location via the use of augmented reality.

Walser, Joe W., III [219] see Jakob, Tina

Walsh, Matt [50] see Scott, Lindsay

Walsh, Mary-Ellen

[255] *Moderator*

Walsh, Rory (University of Oregon)

[24] *Jeju Island Ceramics as Evidence of Overseas Trade*

The inhabitants of Jeju Island, Korea, maintained active trade routes with societies in the Korean Peninsula, the Japanese Archipelago, and mainland East Asia. These interactions are encoded in material culture, including imported pottery. Instrumental Neutron Activation Analysis provides high-resolution data on ceramic geochemistry that allows for differentiation among local Jeju clay sources, peninsular clays, and those from farther afield. Samples from the earliest known pottery-bearing sites on Jeju through the historical period demonstrate the continuing role of overseas trade in Jeju society.

Walshaw, Sarah (Simon Fraser University), Jack Stoetzel (Rice University) and Matthew Pawlowicz (Virginia Commonwealth University)

[285] *Swahili Agriculture and Power Dynamics in Regional Perspective*

Urbanization along the Swahili coast coincided with an increasing importance of Islam, stone architecture, and materials traded through connections built inland as well as with Indian Ocean merchants. Archaeobotanical data from the town of Chwaka on Pemba Island, Tanzania (AD 1100–1500) suggest that foodways turned toward Asian crops, including rice and legumes, during the urbanization process. Beyond subsistence, crops held political power. Jeffrey Fleisher (2010) has suggested that feasting was integral to the process of negotiating and maintaining political power among stone-town patricians, and historic records report that rice and other crops grown on Pemba were mobilized for political relations in Malindi. New data emerging from further south on the Tanzanian coast at Songo Mnara (Kilwa archipelago) demonstrates a different pattern of foodways, relying less on Asian rice and more on African grains sorghum and pearl millet. Further south still, archaeological and archaeobotanical evidence from the Mikindani region demonstrate a continued reliance on African crops and inland connections. Here we employ data from three regions using multiple archaeobotanical methods to consider implications for regionalism in subsistence, agriculture, and land use along the Swahili coast in light of the key role food played in supporting, or contesting, political power.

Walter, Richard [181] see Greig, Karen

Walter, Tamra [220] see Martínez, Valentina

Walton Rogers, Penelope [96] see Spindler, Luke

Walzer, Mariah (Hamilton College), Nathan Goodale (Hamilton College), David G. Bailey (Hamilton College) and Alissa Nauman (Hamilton College)

[79] *Prehistoric Mobility Patterns and Geochemistry of FGV Toolstones at Slocan Narrows Pithouse Village and the Upper Columbia River Area*

The work of Charlotte Beck and George T. Jones dramatically advanced toolstone provenance studies from how to conduct field survey, to how to prepare samples for laboratory analysis. Building on their pioneering work, this paper details the beginning of our efforts in sourcing fine-grained volcanic (FGV) toolstones in the Upper Columbia River area of the interior Pacific Northwest. Handheld portable X-ray fluorescence (HHpXRF) instrumentation

was used to nondestructively analyze the FGV artifact assemblage from Slocan Narrows Pithouse Village. A systematic sub-sample (N = 20) of the FGV artifacts were then destroyed to form glass beads for wavelength dispersive XRF (WDXRF) analysis. In this paper we provide details on the methodology, and we compare the results of both analytical techniques. Results of WDXRF are expected to provide higher quality data that will enable us to resolve and identify toolstone sources whose compositions could not be resolved in the HHpXRF data because of the lower analytical precision that results from variations in artifact size and geometry. The data from this study supplement a broad examination of the lithic assemblage at Slocan Narrows that aims at defining past lithic procurement and use patterns in the Upper Columbia River Area.

Wanatee Buffalo, Suzanne [341] see Noldner, Lara

Wandsnider, LuAnn (University of Nebraska)

[325] *LandUse6k North America: Report and Implications*

LandUse6k is a consortium of archaeologists, historical geographers and historians engaged in synthesizing land use data for various slices of time, to be used to improve the efficacy of climate models. These efforts recognize the large impact that anthropogenic land cover change has had on past climate and climate change trajectory. We report on efforts to characterize land use through time for North America describing methods and issues. We estimate how these characterizations allow for more accurate climate models.

Wang, Chunxue, Quanchao Zhang (Research Center of Chinese Frontier Archaeology), Yao Li (Research Center of Chinese Frontier Archaeology), Ningning Liang (Research Center of Chinese Frontier Archaeology) and Xing Gao (Institute of Vertebrate Paleontology and Paleoanth)

[116] *Archaeological Study of Ostrich Eggshell Beads Collected from Shuidonggou*

Ostrich eggshell beads and fragments collected from Shuidonggou (SDG) reflect primordial art and symbolic behavior of modern humans. Based on stratigraphic data and OSL dating, these ostrich eggshell beads probably date to the Early Holocene (10 ka BP). Two different prehistoric manufacturing pathways are usually used in the manufacture of ostrich eggshell beads in the Upper Paleolithic. According to statistical analyses of the characteristics of ostrich eggshell beads, Pathway 1 is identified from the SDG collections. In pathway 1, blanks are drilled prior to being trimmed to rough discs. These objects exhibit great potential for the study of the origin of primordial art and the development of ancient cultures, and provide important data for studying behavioral options adopted by hominids in the SDG area. In addition, they bear important implications for the origin of modern humans in East Asia.

Wang, Hua (Shandong University), Jing Zhou and Ruin Mao

[117] *Community Memories? Ritual Animal Use of "Qijia Culture," Evidence from Mogou Cemetery, Lintan County, Gansu Province, China*

This study focuses on human ritual animal use behaviors of Qijia communities, with the study of animal bones recovered from the Mogou Cemetery in Gansu Province. More than 1,600 tombs have been excavated at the Mogou site. Since multiple burials with a few individuals of both sex and different ages were common and human bones were clumped together, most burials were classified as multiple and/or secondary burials. Animal offerings were also common in these burials, and animal bones were found either in the burial fills, in the side chambers, or beside the human remains. With application of different zooarchaeological methods and approaches to the animal bones, we have the following patterns and interpretations: 1) Qijia communities prefer pig mandibles rather than cattle and sheep bones, although the later species may be more important for subsistence practices, 2) pigs were domesticated and pig mandibles were probably accumulated for a long time rather than mass killing before the ritual ceremony, and 3) the mass use of pig mandibles may be interpreted as community memory behaviors of Qijia Communities.

Wang, Minghui (Institute of Archaeology, CASS) and Dexin Cong

[115] *Migration and Diversity in Ancient Xinjiang: A Multidisciplinary Approach to the Investigation of Adunqiaolu Population*

The Adunqiaolu site, located in western Xinjiang, belongs to the early Bronze Age and dates to the nineteenth–seventeenth centuries BC. Archaeological evidence suggests that this group of people may have come from southern and/or southwest Siberia, north of Tianshan. Applying both cranial-metrics and aDNA analysis, this study explores regional variations in western Xinjiang and their relationships to other ancient populations. Ancient DNA analysis indicates that their genes are mainly European, specifically Spanish and German, and the same sequences recovered from human bones dating to the beginning of the Neolithic. However, in the process of migration and through time, there are small amounts of Mongolian gene admixture. Preliminary craniofacial morphological analysis shows that their physical characteristics are very similar to the ancient European type. Compared with modern Eurasian populations, Adunqiaolu ancient population is on a branch of the Europa group, having close genetic affinities with Iranians and Europeans. They show a relatively pure European genetic structure.

Wang, Qingzhu, Thomas Fenn (Yale University), Hui Fang (Shandong University), Xuexiang Chen (Shandong University) and Jianfeng Lang (Shandong University)

[287] *pXRF Examination of Shang-Dynasty Bronzes from the Daxinzhuang Site, Shandong*

In this paper I present the preliminary results of pXRF analysis of Shang-Dynasty bronzes from the Daxinzhuang site (1400–1046 BC), Jinan, Shandong province. The Daxinzhuang site has been receiving considerable research interests since the 1930s, especially when the high elite burials were excavated in 2003 and 2010. Much research has been focused on these burials and the elaborate bronzes, but there has not been any research on the chemical composition and casting techniques of the bronzes from the site. The pXRF data from the Daxinzhuang site, together with the published data from Zhengzhou and Anyang, provides a new perspective to explore the interaction of people who lived at the Daxinzhuang site and those of the central Shang power in Henan.

Wang, Tingqiao (University of Chinese Academy of Sciences), YaoWu Hu (Department of Scientific History and Archaeometry), Benjamin Fuller (Department of Scientific History and Archaeometry,) and Dong Wei (Research Center for Chinese Frontier Archaeology,)

[72] *Tianshanbeilu and the Isotopic Millet Road: Reviewing the Late Neolithic/Bronze Age Radiation of Human Millet Consumption from North China to Europe*

The westward expansion of human millet consumption from north China has important implications for understanding early interactions between the East and West. However, few studies have focused on the Xinjiang Uyghur Autonomous Region, the vast geographical area directly linking the ancient cultures of the Eurasian Steppe and the Gansu Corridor of China. Here a Bronze Age isotopic study in China is presented about the key site of Tianshanbeilu, in eastern Xinjiang. The vast range of stable carbon isotopic values on Tianshanbeilu human remains provides direct evidence of unique dietary diversity and consumption of significant C4 resources (millet). Tianshanbeilu's results are then analyzed with respect to 52 Bronze Age sites from across Eurasia, to investigate the spread and chronology of significant human millet consumption. This isotopic survey found novel evidence that the second millennium BC was a dynamic period, with significant dietary interconnectivity occurring between north China, Central Asia and Siberia. Further,

we argue that this "Isotopic Millet Road" extended all the way to the Mediterranean and Central Europe, and conclude that these C4 dietary signatures of millet consumption reflect early links and cultural interactions between inhabitants of modern-day China and Europe in the Bronze Age.

Wang, Tingting [30] see Fuller, Benjamin

Wang, Weilin (Shaanxi Provincial Institute of Archaeology)

[279] *Understanding the Settlement Structure of the Middle Yangshao Period (Miaodigou Phase) Based on Recent Archaeological Discoveries in the Wei River Valley*

As one of the most influential archaeological cultures in prehistoric China, the Miaodigou Phase of the Yangshao Culture has been found widely in many regions. During the Miaodigou Phase, a common cultural identity appeared across China for the first time, which had great significance for the later formation of Chinese civilization. However, archaeological research has until recently been limited to the study of ceramic styles. In recent years, investigations at the Yangguanzhai site in Shaanxi have uncovered a moated settlement with a west gate, a central reservoir, and a large adult cemetery separated from the settlement, while projects at other sites in the Wei River Valley have found large single-room house foundations of the same period. These discoveries have shed light on the internal structure of Miaodigou Phase settlements, and have shown that during this period, dramatic social change occurred, large sites appeared, and a settlement hierarchy began to form. The structure of large settlements also became standardized, and symmetrical site plans appeared. The discovery of large houses also represents early social stratification, and the predominance of single burials is an evidence of the appearance of nuclear family structures.

Wang, Yayi (Research Center for Chinese Frontier Archaeology of Jilin University), Quanjia Chen (Research Center for Chinese Frontier Archaeology) and Chunxue Wang (Research Center for Chinese Frontier Archaeology)

[116] *Zooarchaeological Research of Oracle Bones from Lower Xiajiadian Culture*

Lower Xiajiadian Culture is an early Bronze Age archaeological culture (4000 BP) in Northern China, located at western Liaoning and southeastern Inner Mongolia. This study explores two different kinds of oracle bones from this cultural period: 1) made of cattle scapular was thought to have been burnt in divination, and 2) bone of a mid- to large-sized mammal hoof, thrown during divination. The latter has been scarcely mentioned in the previous research and has not usually been treated as an oracle bone. Through use of zooarchaeological methods, literature comparisons and ethnoarchaeology these two kinds of oracle bones are examined in order to explore human behavior of divination in the Lower Xiajiadian Cultural period.

Wang, Yiru and Hong Zhu (Research Center for Chinese Frontier Archaeology)

[115] *Preliminary Investigations of Human Remains from the Neolithic Gouwan Site in Henan China: Examples of Trauma and Stress*

Traumatic injuries and other osseous evidence of stress are important factors that reflect the health status of past populations. Human skeletal remains excavated from the Gouwan (99 human skeletal remains in total), a Yangshao culture site (ca. 5000–3000 BC) in Xichuan, Henan Province were examined macroscopically for the evidence of skeletal trauma and stress using a biocultural approach. Trauma was investigated to reveal possible types, causes and rigor of activities in this sedentary agricultural community. Additionally, systemic stress indicators such as linear enamel hypoplasia, cribra orbitalia, and osteoperiostitis were also examined to explore childhood and adult lifeways. Comparing with other contemporary populations, our results show that individuals of the Gouwan site experienced elevated risk of trauma in the lower spine, especially the women, suggesting heavy physically-demanding and repetitive activities. High systemic stress in childhood also indicates harsh environmental/social living conditions at the Gouwan in the Neolithic.

Ward, Sheila [83] see Hart, Thomas

Ware Van der Voort, Madeline (University of Nevada, Reno)

[79] *Early Holocene Leporid Processing at the LSP-1 Rockshelter, Oregon*

Human occupation of the Little Steamboat Point-1 (LSP-1) rockshelter in south-central Oregon began ~9,600 cal BP. Artifacts recovered from the pre-Mazama deposits include a faunal assemblage comprised primarily of leporid remains and a lithic assemblage dominated by informal flake tools. I designed and conducted an experiment using replicated obsidian flake tools to identify leporid processing strategies employed by Early Holocene occupants. I performed hide, carcass, and meat processing tasks with the replicated tools on farmed meat rabbits and documented the microscopic use-wear traces of these activities. I then compared the replicated use wear with wear present on 35 obsidian flake tools from pre-Mazama deposits and found that hide processing, including both scraping and cutting, was the most common activity performed at the site. Leporid carcass processing was the second most common activity. These results suggest that the occupants of LSP-1 not only consumed and processed leporid carcasses, but also prepared leporid hides for rabbit skin blanket production.

Warinner, Christina [69] see Ziesemer, Kirsten

Warmlander, Sebastian (Cotsen Institute of Archaeology, UCLA)

[282] *Analysis of Bones and Objects from the Viking Age site of Hrísrú, Iceland*

At the Hrísrú site, located in the Mosfell valley just a few kilometers outside Iceland's capital Reykjavik, the Mosfell Archaeological Project has excavated a tenth-eleventh century farmstead including a traditional Viking Age longhouse, a farm church with an associated cemetery, and a pagan cremation site. At the cemetery and the cremation site human remains in varying degrees of preservation have been unearthed, while in the longhouse a rich material record has been uncovered consisting of e.g., lithic tools, glass beads, animal bones, and occasional metal items such as knives, nails, and keys. In my doctoral research I am using bioarchaeological, archaeometallurgical, and conservation science techniques to analyze this material, in order to better understand the history, living conditions, level of technology, and trade interactions of the inhabitants of the Hrísrú farmstead. Some comparisons with historic written documents are made. This paper presents a first round of results from the ongoing research.

Warnacutt, Camille [341] see Hoffman, Brian

Warner, John

[272] *Social Memory and the Development of Monumental Architecture in the Southern Jequetepeque Valley, Peru*

Numerous theoretical concepts associated with social memory have been employed by archaeologists working throughout the world as a means of explaining continuities and discontinuities in the archaeological record. These social memory-based approaches are varied and include specific avenues of inquiry such as how social memories were actively manipulated for political gain; the role played by monumental architecture in the coalescing of shared memories; and the interrelationship between social memories and architectural forms. Focusing primarily upon monumental architecture, this paper will examine the pivotal role played by social memory in the formation of the dynamic archaeological landscape located in the southern Jequetepeque Valley, Peru.

[272] Chair

Warner, John [359] see Huntington, Yumi

Warner, Mark (University of Idaho)

[348] *Class and Reproductive Control: Birth Control Access and Hygiene among Prostitutes in Turn-of-the-Century Northern Idaho*

Excavations of two brothels in the northern Idaho town of Sandpoint presented a unique opportunity to explore the nuances of economic differences in the lives of two groups of prostitutes. Over 100,000 artifacts were recovered, providing a rich accounting of a brothel that catered to local mill workers and a brothel whose clientele was more affluent. Further, such a large volume of materials resulted in the recovery of relatively esoteric materials such as douching nozzles and a variety of products that, as a group, suggest a greater degree of reproductive control among the women working in the more affluent brothel.

[291] Discussant

Warner-Smith, Alanna

[159] *A View from Somewhere: Mapping Nineteenth-Century Cholera Narratives*

Several scholars have explored the role of the empirical sciences in colonial contexts; far from a neutral study of the world, they were actively making and remaking material, social, and geographic boundaries. Cartography was part of these boundary-making practices, as the varying positions and views of actors engaging with the world are dissolved into the singular, authoritative view offered by the map. Studying a cholera epidemic that moved through the Caribbean in the 1850s, I consider how archaeologists might employ mapping technologies while also keeping in view postcolonial and feminist concerns for positionality, scale, and the situated nature of knowledge. Through the use of ArcGIS and its time-enabled feature, I map the ways in which primary and secondary sources describing the experience of cholera and the disease's movement spatialize the epidemic. More specifically, I probe the scale at which these varying narratives report the epidemic to determine whether it is understood as a broad, regional event or at the level of specific colonies or islands. In exploring these cholera narratives, I raise questions about the concept of the archaeological site, problems of scale, and the power (and limitations) of maps to represent "views from somewhere."

[159] Chair

Warren, Matthew (University of Texas at San Antonio)

[56] *Maintaining an Imperial Borderland: Inka and Indigenous Activities and Interactions in a Threatened Eastern Andean Valley*

In the final decades before the Spanish invasion of the Andes, the Inka Empire struggled to maintain its eastern frontier against the imminent threat posed by the invading lowland Chiriguano peoples. Located within this sparsely populated and loosely connected borderland region was the settlement of Pulquina Arriba, an Inka tampu (waystation) strategically constructed along a preexisting indigenous road network that ran adjacent to a rich river valley. The area's inhabitants were involved in local agricultural operations, and the tampu seems to have been an important component within the infrastructural network supporting Inka colonial activities across the eastern Andean valleys. This talk will present the results of a regional survey and targeted excavations conducted in the vicinity of the Inka site, specifically addressing 1) the Inka and indigenous settlement styles and patterns determined within the study region, 2) the types of activities (economic, military, etc.) in which indigenous groups and the Inkas alike were engaged during their occupations of the area, and 3) the extent to which Inka colonial undertakings affected preexisting indigenous sociopolitical structures and the corresponding implications of these changes.

[56] Chair

Warren, Shannon (George Washington University), Michael Ziegler, Silindokuhle Mavuso (Evolutionary Studies Institute, University of the), Tamara Dogandžić (Department of Human Evolution, Max Planck Institut) and Kathryn L. Ranhorn (Center for the Advanced Study of Hominid Paleobiol)

[87] *Mapping MSA Deposits: Regional Geological Investigation of Upper Chari Member Sediments in the Ileret Region, East Turkana, Kenya*
The Ileret region of the Koobi Fora Formation (KF Fm.), located in Kenya's Turkana Basin, has historically been the focus of extensive archaeological research. Mid-Late Pleistocene units have previously lacked defined sedimentary beds due to an understudied unconformity of the upper Chari Member (1.34 Ma to 10 Ka). This represents a substantial limit to Middle Stone Age (MSA) research. Recent fieldwork (2016) incorporated a geoarchaeological survey of the upper Chari Member. Here we describe and map the associated lithologies and stratigraphic markers of this sedimentary package. We identify a major unconformity in the upper Chari and correlate the stratigraphic and structural features of this sedimentary unit across space in Ileret. Importantly, we associate the angular unconformity that defines the lower boundary of this unit with in situ and deflated MSA artifacts. This sedimentary unit (SSM) underlies Holocene sediments and sits uncomfortably above volcanic ash, allowing a robust chronostratigraphic framework for the SSM and associated MSA artifacts. The study of SSM provides geoarchaeological and paleogeographical context regarding tectonic setting and controls of sedimentation during this time in the stratigraphic sequence of the KF Fm. This research was supported by IRES grants 1358178 and 1358200 from the U.S. National Science Foundation.

Warren, Shannon [153] see Ziegler, Michael

Warrick, Gary

[256] Discussant

Waselkov, Gregory (University of South Alabama)

[385] *Bear/Human Relationships in Southeastern Native North America: Creating Archaeological Models from Historical Accounts*

Historical accounts and ethnographic studies of the Indians of greater southeastern North America dating from the sixteenth to twentieth centuries contain abundant information on native people's attitudes toward black bears (*Ursus americanus*). These records provide a basis for inferences about changes in subsistence exploitation of bear populations in the Southeast over the last five centuries, while offering clues about longer-term non-

subsistence relationships between bears and humans that developed over millennia. The unique roles of bears as liminal beings—at times other-than-human, a third gender, intermediaries between plants and animals—have barely been explored by archaeologists. Rethinking bears from southeastern Native North American perspectives opens new lines of inquiry for archaeologists.

[385] *Chair*

Washburn, Eden (University of California Santa Cruz) and Lars Fehren-Schmitz (University of California Santa Cruz)

[245] *A Molecular Anthropological Reexamination of the Human Remains from La Galgada, Peru*

The archaeological site of La Galgada is located on the eastern bank of the Tablachaca River in the highlands of Northern Peru. The site was dated to both the Preceramic period and Initial period through a combination of detailed archaeological investigation of the site complex, and the use of radiocarbon dating of material collected stratigraphically. Human remains found at the site were also categorized into these two periods based on stratigraphic location. However, recent radiocarbon dating of the human skeletal remains found at the site contradicts the initial dating results. In light of the time period discrepancies, questions surrounding the relationships between individuals, including whether individuals buried at the site were local vs. nonlocal, were addressed by reanalyzing ancient mitochondrial and nuclear DNA of the individuals dating to both time periods. Additionally, through collagen extracted from bone samples, stable carbon and nitrogen isotopes were measured in order to reconstruct changes in diet, with the goal to potentially shed light on the social organization present at La Galgada. Data from this study will provide key information into understanding the occupancy and use of this site, as well as provide insight into the possible reuse of the site as a burial location.

Watanabe, Aldo [29] see Castillo Butters, Luis

Watanabe, Shinya (Nanzan University, Japan)

[170] *Sociocultural Changes in Cajamarca Region during the Early Intermediate Period and the Middle Horizon*

In this paper we discuss the chronology of the Cajamarca culture of the Peruvian Northern Highlands to consider the social dynamics during the Early Intermediate Period and the Middle Horizon. We present the excavation data from the two archaeological sites, Complejo Turístico Baños del Inca and El Palacio that correspond to the period from the final part of the Early Cajamarca Phase to the Middle Cajamarca Phase. The Cajamarca culture during the Middle Cajamarca Phase A (AD 600–750) presents maximum cultural integration as indicated by the characteristics of kaolin ceramics and settlement pattern, while we can observe the ceramic diversity during the Middle Cajamarca Phase B and C (AD 750–950). We analyze the subterranean canals of the two sites that would indicate the climatic condition of those periods. Finally we consider the character of the Cajamarca culture and society. The Cajamarca presents cultural continuity and flexibility as long as 1,600 years and it contrasts with the vulnerability of other cultures as Moche and Lima.

Waters, Michael (Texas A&M University)

[226] *The Emerging 13,000 to 15,000 cal yr BP Archaeological Record of North America South of the Continental Ice Sheets*

Ruth Gruhn was an early advocate for a human presence in the Americas prior to Clovis. Gruhn and her late husband, Alan Bryan, excavated and reported on early sites in both North and South America and championed the Pacific coast as the route taken by the earliest people to reach the Americas. Their predictions have become a reality. Genetic and geological evidence is supporting a coastal migration route into the Americas. Recent discoveries at the Page-Ladson site, Florida, the Debra L. Friedkin site, Texas, and other sites, as well as a number of genetic studies support an occupation of the Americas by at least 15,000 cal yr BP; some 2,000 years before Clovis emerged on the North American landscape. The revision in our understanding of the timing of the arrival of humans to the Americas at the end of the late Pleistocene and the route they took has its roots in the early pioneering work of a courageous and visionary woman—Ruth Gruhn.

[6] *Discussant*

[226] *Chair*

Waters, Michael [81] see Carlson, David

Watkins, Christopher (Arizona State University), Christopher Garraty (Logan Simpson Design), Travis Cureton (Logan Simpson Design), Dave Bustoz (Logan Simpson Design) and Erik Steinbach (Logan Simpson Design)

[335] *The Path of Hua'm A Nui: Aggrandizement among the Classic Period Phoenix Basin Hohokam*

O'Dohm oral histories describes the overthrow of Hua'm a Nui (Yellow Buzzard) and other arrogant rulers of platform mound villages in the Phoenix Basin. These oral histories are consistent with archaeological data that point to increasing social stratification during the Classic Period. This paper addresses the question of how the household-based egalitarianism of the Preclassic developed into Late Classic hierarchy. Leveling mechanisms that previously channeled aggrandizers into socially acceptable prestige-building began to break down during a period of instability and uncertainty of the Preclassic to Classic transition. Aggrandizers gradually reshaped Hohokam social organization to their own ends—a process that culminated in the Late Classic period with elites living on platform mounds constructed by others. An example of aggrandizement was recently identified during excavations at the village of La Plaza in Tempe. A regular alignment of several puddling pits immediately adjacent to the platform mound suggests that construction and/or maintenance of this structure was a well-organized group activity. These Late Sedentary/Early Classic pits were last used after communal winter canal maintenance but before household-based spring planting, suggesting that an aggrandizing work boss appropriated and redirected canal labor crews to work on the platform mound.

Watkins, Tia B., Rafael Guerra, Rosie Bongiovanni and Kirsten Green

[267] *Living at the Ritz: Investigations of the Palace Complex at Lower Dover, Belize*

Palatial complexes are distinct architectural features within ancient Maya civic ceremonial centers. Maya palaces are commonly multi-roomed complexes featuring attributes such as corbelled roofing, benches, private courtyards, and other decorative attributes. Archaeologists suggest palatial complexes serve as multifunctional spaces for the elite residents. These functions include residential space as well as ritual space for events such as feasts, dances, and other social events. Excavations at the Late Classic site of Lower Dover, located in the Belize Valley, revealed the presence of many of these attributes. This paper discusses results of recent excavations conducted under the auspices of the BVAR Project during the 2016 field season in the palace complex at Lower Dover. The data recovered contributes to our understanding of the site's occupation chronology as well as structural layout and function of the palace. This research further enhances our understanding of Lower Dover's position within the political landscape of the Belize Valley during the Late Classic period.

Watling, Jennifer [62] see Shock, Myrtle

Watling, Jennifer (University of São Paulo), Eduardo Góes Neves (University of São Paulo), Guilherme Mongeló (University of São Paulo) and Thiago Kater (Federal University of Sergipe)

[327] *From the First to the Last Terras Pretas: Changes in Cultural Behavior and Terra Preta Formation in the Upper Madeira River, Southwest Amazonia*

Terras pretas (TPs) are arguably the most visible and widespread artifacts of precolonial occupations in Amazonia. Accumulated as the result of waste management practices by at least partly sedentary populations, they are seen to mark the beginnings of landscape domestication and more agricultural-based societies starting ca. 3000 BP. On the bluffs of the Upper Madeira River, exceptionally early TP deposits were found dating more than 3,000 years before TP sites in the rest of the basin. While differing substantially from later TPs in the same region in terms of composition and depositional context, some have linked these early TPs to manioc agriculture; however, the cultural behaviors and degrees of intentionality that formed these first dark earths are little understood, and mounting evidence suggests manioc domestication occurred long before TP sites appeared. We discuss recent archaeological and archaeobotanical investigations at Teotônio site (Porto Velho, Rondônia) which has preceramic TP occupations dating from ca. 6500 cal. BP, followed by ceramic TP occupations (3000–500 BP), and where a super-abundance of riverine resources made it an important geographical and social landmark throughout history. We documented plant resource use and environment at Teotônio to better understand the different cultural behaviors involved in TP formation over time.

Watrall, Ethan (Michigan State University)

[18] *Building Scholars and Communities of Practice in Digital Heritage and Archaeology*

As digital methods have become more ubiquitous in archaeology, the challenge of teaching those methods has become important. Beyond the question of how and what we teach, however, there is an equally important challenge—how do we build communities of practice populated by scholars who are connected through a shared perspective on both the methods and the thoughtful application of those methods. In is within this context that this paper will explore an approach developed at Michigan State University that speaks to both teaching (and learning) digital methods and the development of communities of practice in which those methods are relevant. The approach itself is informed by the activities in three separate venues: The Cultural Heritage Informatics Graduate Fellowship Program, the MSU Department of Anthropology Digital Heritage Fieldschool, and the National Endowment for the Humanities funded Institute for Digital Archaeology Method & Practice. Ultimately, the goal of this talk is not just to discuss the Michigan State University approach, but to suggest a series of best practices for building capacity and community among students and scholars in digital heritage and archaeology that could be adapted and adopted in a wide variety of institutional, professional, or scholarly settings.

[312] *Discussant*

[18] *Chair*

Watson, Adam (American Museum of Natural History), Patricia Gilman (University of Oklahoma), Douglas J. Kennett (Pennsylvania State University), Peter Whiteley (American Museum of Natural History) and Stephen Plog (University of Virginia)

[130] *The Exotic and the Sacred: Evidence for Ritual Uses of Birds and Long Distance Exchange at Chaco and Mimbres (AD 800–1200)*

Birds are key actors in Pueblo narratives of emergence and symbolize the six sacred directions in Pueblo cosmology and in some instances religious sodalities and societal divisions; bird feathers are powerful offerings to the supernatural, carrying prayers to the gods who in turn use them for adornment. Simply put, birds are central to modern Pueblo cosmology and social and religious life. Similarly, iconographic representations and the ritual treatment of avian species such as the Scarlet Macaw (*Ara macao*) and Golden Eagle (*Aquila chrysaetos*), evident in the archaeological record of Chaco Canyon and the Mimbres region, reflect the ceremonial importance of birds to Ancestral Pueblo peoples. This paper investigates the differing ritual uses of birds in Chacoan and Mimbres society through new AMS radiocarbon dates and stable isotope assays and considers the implications of these new data for our understanding of the development of long distance networks and the rise of social elites and religious specialists.

Watson, Caroline [79] see Jones, Eric

Watson, James (University of Arizona), Ivan Munoz (Universidad de Tarapacá) and Bernardo Arriaza (Universidad de Tarapacá)

[143] *Biocultural Evolution of the Oral Complex in Coastal Atacama and the Interplay of Selection, Plasticity, and Population Histories*

Indigenous groups have inhabited and exploited the coastal valleys of the Atacama Desert since Paleoindian times. Contact with the altiplano began early on but marine-based diets were eventually supplemented by agricultural adaptations as influence turned to population movement over time. We propose that the oral complex was likely subject to some degree of selection early in the sequence in response to dietary demands, but would have been relaxed as diet diversified and softened. This trend would subsequently have been disrupted by the influx of different populations from surrounding areas. We test these hypotheses by examining crown dimensions, evidence for decay and defects, and wear rates in a sample of 591 individuals (15,398 teeth) from archaeological sites in the Azapa Valley of northern Chile that span most of the precontact cultural sequence in the region. Results indicate that social changes over time, particularly diet composition and food consistency, caused steady increases in decay and defects. In contrast tooth wear was variable across time likely reflecting the continued consumption of local marine resources. Finally, fluctuating crown dimensions, enamel damage, and evidence for directional asymmetry may reflect the complex interplay between relaxing selection and gene flow.

Watson, Jessica

[319] *Cultural Dimensions of Food Procurement on Martha's Vineyard*

Archaeology along the northeastern coast of the United States has often focused on island and coastal industries, with particular emphasis on shell midden deposits. Subsistence-focused research shows us that seafood played a large role in prehistoric diets, yet these studies rarely focus on the cultural dimensions of these foods. Faunal remains on Martha's Vineyard show that early residents ate a diverse selection of land and sea animals. Identified bones reveal a broad diet of mammals, including White-tailed deer (*Odocoileus virginianus*) and canids; fish, ranging from inland freshwater species to marine species; and birds, including terrestrial, nearshore, and offshore taxa. These fauna have previously been studied for their basic dietary and environmental data. In this presentation they will be examined in terms of their cultural role in prehistoric settlements on the island. Analysis looks at the social aspects of food procurement, processing, and discard during the Archaic and Woodland periods. Issues discussed include the role of domestic dogs (*Canis familiaris*) in food procurement, gendered roles of offshore bird hunting, and trade and transportation of animals to the island. This research incorporates stable isotope analysis with traditional zooarchaeological data to better address the role of food in social identity and trade.

Watson, Lucia Clarisa (Universidad Nacional Autónoma de México), Krzysztof Makowski (Pontificia Universidad Católica del Perú) and Jessica Christie (East Carolina University in Greenville)

[272] *Constructing Social Memory: Inca Politics and Sacred Landscape in the Lurin Valley*

We will discuss the characteristics and scope of Inca politics in the Lurin Valley by focusing on the results of excavations carried out by Makowski (2016) in Pachacamac with its famous Imperial Inca temple and oracle, as well as in the administrative center Pueblo Viejo–Pucara. The comparison of landscape transformed by Imperial infrastructure between the Highlands of Cuzco (Christie 2016) and the lower Lurin Valley allows to reconstruct the mechanisms through which social memory was channeled for political purposes which were similar in both cases, even though the forms and techniques of ceremonial architecture were so different due to the separate cultural origin of the builders and users of these spaces. In Pachacamac and Pueblo Viejo, the Inca administration constructed plazas and compounds with restricted access, each one of which probably served a specific population group. The location of the plazas and communication axes maintained a direct visual connection with specific mountains and rocks which were modified and transformed into new huacas incorporated in the Imperial cult. In this new architectural setting, ritual networks of blood-related, ethnic, and ceremonial kinship as well as political compromises were sealed, negotiated, and affirmed through social performance.

Watson, Rachel (Louisiana Division of Archaeology), Heather McKillop (Louisiana State University) and Brooks Ellwood (Louisiana State University)

[281] *Attractive Salt: What the Magnetic Susceptibility and Stratigraphy of the Witz Naab and Killer Bee Mounds Reveal about Ancient Maya Salt Production and Economy*

Witz Naab and Killer Bee contain some of the last remaining above-ground mounds of a once-thriving salt industry in Punta Ycaos Lagoon, a large salt-water system in Paynes Creek National Park, Belize. Documented sea level rise during the Terminal Classic has submerged the once thriving Classic period (AD 300–900) Maya salt works. Excavations and magnetic susceptibility were conducted as part of the author's dissertation research at Louisiana State University (LSU). This excavation is part of a larger NSF funded project directed by Dr. Heather McKillop (LSU) mapping the wooden architectural remains of the large scale Paynes Creek Salt works. Magnetic Susceptibility samples were collected utilizing a technique developed by Dr. Brooks E. Ellwood (LSU) and processed by the Department of Geology. This paper will discuss the stratigraphy and the results of the magnetic susceptibility in relation to the stratigraphic interpretation. These mounds were once numerous features on the landscape prior to a sea level rise, understanding the stratigraphy of the mounds will aid in interpreting features of the associated submerged salt works and illustrate an increase in the scale of production and aid in the interpretation of the coastal Maya of this regions participated in the broader Maya economy.

Watson-Charles, Carmen

[228] *Discussant*

Watt, David (Tulane University)

[294] *The Nature of Place: Changing Mortuary Traditions During the Contact Period*

Community and identity among Mississippian communities were centered on cultural landscapes; reified by monumentality and complex political economies, regional interaction, and mortuary traditions. The transition at the end of the Mississippian period is marked by regional collapse, migration, diaspora, and ideological shifts. There is also a reimagining of complex religious and sociopolitical structures, creation of new cultural landscapes, and reconceptualization of collective traditions. Faced with the adversities of a changing and globalizing world, population crisis in the forms of disease and warfare, and forced migrations, latent Mississippian communities were forced to adapt and change to meet these pressures and ensure community cohesion. Changing mortuary traditions of populations at the cusp of political and social change during European contact exemplify how these important socioreligious responses to adversity affect the dynamic political interplay between colonial powers and indigenous populations during the seventeenth and eighteenth centuries. Mounds, cemeteries, and mortuary centers of Lower Mississippi Valley peoples that came under assault were also representative of an attack on that very place, cultural landscapes embedded with memories and histories of particular communities. And in the creation of new mortuary traditions and mortuary spaces, these communities sought to reimagine traditions in new and resilient ways.

Weaver, Brendan (Berea College)

[331] *Supplies, Status, and Slavery: Contested Aesthetics at the Haciendas of Nasca*

The coastal wine and brandy-producing estates owned by the Society of Jesus in Nasca held captive a large enslaved population in the seventeenth and eighteenth centuries. With a combined population of nearly 600 slaves of diverse sub-Saharan origins, San Joseph and San Xavier de la Nasca were the largest and most profitable of the Jesuit vineyards in the viceroyalty of Peru. These estates were also home to black freepersons and itinerant indigenous and mestizo wage laborers who engaged, exchanged goods, developed intimate relationships, and even married enslaved persons tied to the estates. Enslaved actors made use of goods supplied by their Jesuit administrators along with products that they provisioned themselves, grew in their own gardens and fields, made locally by craft specialists on the estates, or obtained through exchange with free residents and visitors who connected the estates to a broader colonial market. The aesthetic worlds of the estates were contested through the ways in which enslaved actors engaged with each other and their free neighbors, provisioned themselves, and made use of material culture, often strategically manipulating their statuses and making meaning in ways reflective of their diverse origins and entanglements.

[64] *Discussant*

Weaver, Eric [301] see McCrackan, Jennifer

Webb, Paul [160] see Benyshek, Tasha

Weber, Sadie (Harvard University)

[238] *Life on the "Periphery": Pastoralism at Atalla*

Atalla, located in the south-central Andes of Peru in the province of Huancavelica, boasts a monumental temple and expansive, multi-phase domestic areas. Occupation of the site intermittently spans approximately 3,000 years, and human presence in the surrounding area likely predates this site. Recent excavations focusing on both the monumental and domestic sectors of the site have yielded faunal remains from nearly all contexts. Here, I present an analysis of the faunal remains and bone tools from all periods of occupation at Atalla, focusing primarily on the earliest occupations of the site. I integrate zooarchaeological and microbotanical data to explore the emergent pastoral economy in relation to Atalla's potential role as both a distributor of cinnabar and a central locus of interregional exchange.

Weber, Sadie [222] see Mesia, Christian

Weber, Andrzej (University of Alberta/Aix-Marseille University)

[330] *Middle Holocene Hunter-Gatherer Archaeology in the Baikal Region, Siberia: Recent Developments and Future Directions*
Over the last 20 years, the Baikal Archaeology Project has invested much effort and many resources into research on Middle Holocene hunter-gatherers of the Cis-Baikal region in Siberia (~8300–3500 cal BP). Examination of new materials excavated by the project and analysis of previously accumulated archaeological collections produced many new insights on just about every aspect of Baikal's hunter-gatherers. We now have a very good record of spatial and temporal variation in diet, subsistence, mobility and migrations, health, trauma and activity patterns, population size and distribution, mortuary practices and some information on genetic structure. A recent breakthrough is the development of a method for building high-resolution chronologies (HRC) of decadal resolution for the region's Middle Holocene cemeteries. The method is important because it allows examination of the entire body of data from Baikal's hunter-gatherer cemeteries from a fresh chronological perspective. The most important discoveries facilitated by HRC include: identification of dietary trends during the Early Neolithic, identification of a substantial gap in the use of one large Early Neolithic cemetery and substantial revisions to the timing of all Middle Holocene culture historical periods. The paper reviews these discoveries and outlines future work.

[330] *Chair*

Webster, Andrew (University of Maryland)

[207] *Marginality in a Connected World: Consumption and Consumerism in Nineteenth-Century Rural Ireland*
Although, the rural Irish are often characterized as a geographically and economically isolated people, their material culture reveals that in the nineteenth century, they were part of a growing global economy—one that circulated both goods and people around the British Empire and beyond. While the industrial revolution and the spread of capitalism allowed for greater access to a variety of goods for the rural Irish, they also maintained a class system that perpetually confined the rural poor to marginalized positions within society. These men and women negotiated this system through their consumption of material goods to create a sense of self and a cultural identity. This paper uses archaeological and historical data to explore the economic and anthropological processes of trade, exchange, availability, and access at the local, national, and international levels.

Webster, Chris (DIGTECH—APN—PCS—Codifi—@archeowebby) and Tristan Boyle (Archaeology Podcast Network)

[37] *Podcasts as Archaeological Digital Preservation*

Archaeologists are increasingly collecting and storing archaeological data in a digital format. While a lot of time and effort has been spent on the HOW of digital information collection, little time has been spent on the other side—public outreach. An archaeologist's job is only half complete when the digital data are safely stored on multiple servers and in an archival format. If no one knows about it did it ever really matter? Podcasts are typically free and are accessible by everyone with the ability to hear. They are easy to create, store, and disseminate. The Archaeology Podcast Network has gone from a few thousand to over 30,000 monthly subscribers in just over two years—proving that the general public WANTS to know about what we're collecting and storing. Since podcasts are inherently digital, they can be preserved as the audio record of the collected digital information.

[111] *Moderator*

Webster, David (Penn State University)

[71] *Creeping Collapse at Copan*

Over the last decade archaeologists have shifted from dramatic accounts of collapse to more nuanced narratives of decline and disruption, resilience and recovery. This shift partly reflects richer archaeological data, and partly fashion. Although Copan has long been a poster-child for the Classic Maya collapse, the history of research there has long prefigured this shift in archaeological perception and contributed importantly to it.

[41] *Discussant*

Webster, Laurie (University of Arizona) and Edward Jolie (Mercyhurst College)

[373] *Aztec's Textiles, Baskets, and Other Perishable Traditions: Contributions of Recent Perishables Research to a New Understanding of the West Ruin*

Earl Morris recovered more than 1,500 perishable artifacts from the West Ruin of Aztec, but his publications provide only a glimpse of the diversity, richness, and strong research potential of this relatively well-preserved and well-provenienced perishable collection. In this paper, we discuss our recent reanalyses of these assemblages and present new insights related to Chaco-Aztec relations and the organization of ritual practice, society, and craft production at Aztec. We also highlight continuities and discontinuities between the twelfth- and thirteenth-century perishable assemblages to interpret Aztec's changing place in the late prehispanic Pueblo world.

Webster, Laurie [60] see Gearty, Erin

Weed, Jonathan [333] see Klassen, Sarah

Wegter, Bruce [343] see Arnn, Anna

Wei, Dong (Jilin University, Research Centre for Chinese Frontier Archaeology) and Si Yang (Beijing Yuanming Company Ltd.)

[115] *Cranial Trepanations in Bronze Age and Early Iron Age Xinjiang*

Trepanation is defined as the intentional removal of a piece of bone from the cranial vault of a living individual without penetration of the underlying soft tissues. In China, practicing trepanation can be traced back to the Neolithic, and it can still be found today in some populations in other parts of the world. Nine skulls with lesions from four Late Bronze Age and Early Iron Age cemeteries (Yaer from Hami, Goukou from Jinghe, Yanghai from Tulufan, and Choumeigou from Changji) (4000–2000 BP) in Xinjiang were investigated macro- and microscopically. In conjunction with other information obtained through generation of bioarchaeological profiles of these skeletal assemblages, the aim of this study is to contextualize the observed trepanation cases with their archaeological settings and to explore their temporal and spatial distribution and social/cultural implications. Signs of new bone deposition, implying the short or long-term survival of all individuals after the operation, may indicate that during the Late Bronze and Early Iron Ages in Xinjiang trepanation had been a well-practiced procedure, in turn supporting the suggestion of its importance as a therapeutic method in these ancient peoples.

Wei, Dong [72] see Wang, Tingting

Wei, Qiaowei

[213] Made Locally or Long-Distance Transportation? New Evidence on Ceramic Vessels from Salt Production Sites from the Late Shang Period in North Shandong

Research on salt production in Ancient China has been examining the function, typology, and chronology of a certain type of ceramic vessel, the kuixingqi (Helmet-shaped vessel). Instead of examining typology of Kuixingqi vessels from salt workshops at North Shandong region, dated to 3000 BC, I began by looking at how those Kuixingqi vessels made and transported into the salt workshops, if those vessels are not made locally. I will present the findings of the ceramic petrographic analysis conducted on Kuixingqi vessels by the low res microscope. This analysis gives us better understanding of how ceramic vessels made for salt workshops, and what was the baseline for salt workshop managed the production process.

Weide, D. Marie (University of Nebraska-Lincoln), Maria C. Bruno (Dickinson College), Christine A. Hastorf (University of California-Berkeley) and Sherilyn Fritz (University of Nebraska-Lincoln)

[95] "The Decoupling of Environment" and Political Change in the Prehistoric Southern Titicaca Basin

As the greater project of this symposium attests, we want to become more aware of the constraints of our historical training and try to not separate culture from nature, or politics from the environment in our study of the past. Toward that end, the authors have been working on understanding water and lake level regimes of the southern Titicaca Basin, to better understand the history of this shallow lake and the people that lived around it from the Formative through the Late Horizon. Throughout this prehistoric sequence a large polity, Tiwanaku, developed in this region, clearly engaging with the landscape and waterscape of their valley. Many scholars have linked Tiwanaku's political and economic rise to a rising lake and its fall to a desiccation and lack of lake water. The new lake data presented here clearly demonstrate how the political trajectory of the prehistoric sequence does not parallel the lake's history, thus allowing us to better understand the impact prehistoric societies had on their environments and vice versa.

Weiland, Andrew (Ohio State University), Laura Crawford (Ohio State University) and Bret J. Ruby (Hopewell Culture National Historic Park)

[53] Fires at Axis Mundi: Macro- and Microbotanical Investigations of a Hopewell Woodhenge

At Hopewell Mound Group in Ross County Ohio (33RO27), 2013 magnetic gradiometer investigations redefined the long invisible Great Circle, a 120 m diameter woodhenge. The 2016 excavation of one of four central features within the Great Circle revealed a large thermal feature. Although unusually large for this purpose, the arrangement of fire-cracked rock, clay lining, hot-burning hardwoods, and grass seed suggest a classic earth oven common to domestic sites. However, ethnographic analogy indicates that woodhenges, which are ubiquitous in eastern North America during the Middle Woodland period (AD 1–500), were used in axis mundi rituals such as the modern Sundance. In the Hopewell cultural context, there exists a dichotomy between sacred sites swept clean, and domestic debris of habitation sites. Thus, archaeobotanical analysis of an earth oven central to a Hopewellian ritual reveals a mixture of domestic and ceremonial symbolism potentially indicative of feasting. Careful archaeobotanical analysis is central to understanding the formation, function, and meaning of this feature—and Hopewell Mound Group as a whole. In this focused study on one large feature, we use seed and wood charcoal identification in conjunction with phytolith extraction to assess stratigraphy and to detect remains of removed or uncarbonized plant use.

Weiner, Robert (Haffenreffer Museum of Anthropology, Brown University)

[157] Playing with Fate: A Relational and Sensory Approach to Pilgrimage at Chaco Canyon

Chaco Canyon is generally understood to have derived its regional influence by virtue of ceremonial power. But what exactly—experientially, sensorially, affectively—was so compelling about the experience of Chacoan ritual, and how might we approach these immaterial dimensions of the archaeological record? In this paper, I suggest that ceremonial gambling/gaming was an important practice during Chacoan gatherings that allowed participants to interact directly with supernatural forces. After briefly discussing multiple lines of evidence for gambling at Chaco, I emphasize the sensory and affective dimensions of games of chance. For example, ethnographic Native American gaming was often accompanied by fervent singing and shouting to distract the opposing team. Furthermore, gambling is primarily an endeavor that deals with The Unknown: with forces known variably as "fate," "divine favor," or "luck" depending on one's worldview. To gamble is to enter a direct and highly-charged relationship with those unseen agents who make dice land heads or tails, who bring plentiful rainfall one year and not the next. I argue that the relationalities experienced by Chacoan gamblers with supernatural forces and with each other—and control over access to such experiences—formed crucial elements of the site's allure and power.

Weiner, Robert [23] see Shepard, Lindsay

Weismantel, Mary (Northwestern University)

[242] Ontologies of Water: Intensities and Magnitudes

Increasingly, the effects of global warming take the form of destructive movements of water, whether vanishing bodies of water that create desertification or floods that damage human habitations and take lives. The extensive archaeological record of the North Coast of Peru offers a place to study long-term human strategies for living with the dangerous and unpredictable movement of water. Despite frequent earthquakes, floods and torrential rains that re-shape land- and seascapes, humans flourished on the North Coast, using the region's abundant maritime and riverine resources to construct some of the earliest monumental architecture in the Americas, and later, complex state-level societies such as Chimú. Archaeological theories about the relationship between this rich archaeological record and the region's tempestuous waters have variously included theories of punctuated equilibrium; collapse and rebuilding; or, more recently, long-term sustainability based on strategies of mobility and flexibility. In this paper I look for the underlying indigenous ontologies that allowed humans to flourish despite the destructive yet fertile waters that periodically inundated their homes and fields. From this perspective, our species appears as the coproducers of a fluid natureculture in which we are neither the controlling masters nor the hapless victims of water.

Weiss, Andrew (University of Pennsylvania) and Vincent C. Pigott (University of Pennsylvania Museum)

[271] Here We Go Again: A New Series of AMS Dates from the Kkho Wong Prachan Valley, Central Thailand

A new series of AMS dates from the Khao Wong Prachan Valley (KWPV) in central Thailand addresses several key questions in the region, including the dating of the initial settlement of the valley, the duration of the pre-metal period, the first appearance of copper-base artifacts, the beginning of large-scale crucible-based copper smelting and production at the site of Non Pa Wai, the shift to a different copper production technology used at Nil Kham Haeng, and, the occupation span of the associated habitation site of Non Mak La. Defining the temporal extent of these industrial deposits allow us to estimate the production intensity of copper in the Khao Wong Prachan Valley. The dating program's strategy and results are discussed, along with the implications for the prehistory of Thailand and Southeast Asia, with particular focus on the ties between the KWPV and copper-age sites in the Phimai region in NE Thailand.

Weisskopf, Alison (University College London) and Dorian Q. Fuller (University College London)

[333] Elusive Wild Foods in Southeast Asian Subsistence: Modern Ethnography and Archaeological Phytoliths

While grain crops, such as rice, are relatively easy to identify in the archaeobotanical record, evidence for early agriculture in the wet tropics can be elusive. In this region staple foods were not always grain-based and even today wild plants play an important role. So how do we identify ancient food pathways? Unlike temperate parts of the world, charred material rarely preserves, so this is where micro fossils such as phytoliths and starches come into play. I use phytoliths in combination with ethnobotany to evaluate plant remains from archaeological sites in Thailand and Vietnam and identify past arable systems.

Weiss-Krejci, Estella (Austrian Academy of Sciences, Vienna, Austria)

[31] *Osteonarratives in the German-Language Tradition*

This paper will discuss the research history of "osteobiography" in German-language anthropology and archaeology. That the term "Osteobiographie" is actually not in use does not imply that the concept does not exist. Although German-speaking prehistoric anthropologists were and still are predominantly focused on population research, science-based stories relating to individuals have been told, for instance, about Ötzi the Iceman. On closer inspection such narratives reveal a tendency to surface under very particular circumstances: they are either triggered by a particular find context, by specific osteological characteristics or by historic circumstances under which these bodies are discovered. Hence, like all biographies, osteonarratives run the danger of being subject to manipulation in many ways. The paper analyses some of these narratives and discusses current trends and attitudes relating to osteobiographies in the German-speaking archaeological and anthropological research community.

Weiss-Krejci, Estella [83] see Dodge, Robyn

Weitzel, Elic (University of Connecticut) and Daniel Plekhov (Brown University)

[260] *Contact-Period Settlement Changes in Eastern North America: A Test of the Ideal Free and Ideal Despotic Distribution Models*

Archaeological and historic data suggest that prior to European Contact, Eastern North America was heavily populated. However, within a century of Contact, the indigenous population was decimated. To explore one of many behavioral changes brought about by this demographic collapse, we model indigenous settlement in Eastern North America pre- and postcontact as a function of environmental productivity. We hypothesize that if postcontact settlement differed from precontact, two scenarios are possible: settlement changes may conform to an ideal free distribution (IFD) if the average net primary productivity (NPP) of site locations improves postcontact, or an ideal despotic distribution (IDD) if average site NPP declines. Using data from the Canadian Archaeological Radiocarbon Database, we find that overall, the NPP of the average site increases after Contact suggesting settlement according to an IFD at this time. Reductions in population allowed consolidation of people in higher quality habitats. However, geographically weighted regression indicates regional variability in this trend and possibly the opposite pattern, a decline in NPP conforming to an IDD, in some locations of Eastern North America. Therefore, while the overall trend is one of movement toward high-quality locations, Europeans appear to be forcing indigenous peoples into more marginal habitats in certain places.

Welch, John (Simon Fraser University)

[172] *Open Eyes, Open Minds, Open Arms, and Open Hearts Open Archaeology*

Archaeologists share formidable qualities of mind and temperament: observational acuity, organizational skill, perseverance. These are necessary, of course, in the sifting through of vast arrays of questions to address, evidence to harness, methods to deploy, and interpretive lenses to employ. Such rigor-making attributes may not, however, be sufficient for effective practice at hazy contacts among material pasts and intangible presents, for negotiating meanings and values out of that haze, or for investing those meanings and values into projects with non-academic benefits and beneficiaries. Success in such pursuits, including transdisciplinary research and community-driven practice, often requires high tolerance for ambiguity in measures at least equal to precision and consistency. Keeping eyes, minds, and arms open to possibilities for unanticipated ways of seeing, knowing, and collaborating—a discipline dependent as much on relaxation as on rigor—opens archaeology to the benefits of humankind's most potent ally, positive affect.

Welch, John [34] see Tosa, Paul

Weldy, Megan [368] see Mead, Kent

Welker, Frido (Department of Human Evolution, MPI-EVA)

[96] *Ancient Hominin Bone Proteomes: Improving our Understanding of Past Human Behavior through the Study of Ancient Bone Proteins*

The analysis of ancient proteins is increasingly used to study archaeological and anthropological bone specimens from prehistoric time periods. This ranges from large-scale ZooMS screening (Zooarchaeology by Mass Spectrometry) of morphologically unidentifiable specimens to the targeted analysis of ancient bone proteomes from humans through the application of LC-MS/MS. Here, some biological and phylogenetic results that can be obtained through the analysis of ancient human bone proteomes will be discussed in the light of the Châtelperronian, "transitional," technocomplex of western Europe. This technocomplex is chronologically placed between Middle Paleolithic (MP) and Upper Paleolithic (UP) lithic industries and displays behavioral aspects interpreted as intermediate between what is typically seen in the MP and UP. Despite intense research interest, the biological association of the Châtelperronian to either Neanderthals and/or Anatomically Modern Humans remains much debated. The analysis of a Pleistocene hominin bone proteome associated to the Châtelperronian allowed us to establish the biological affiliation of this specimen, and this will be presented together with biological insights obtained through the analysis of the same bone proteome.

[96] *Chair*

Welker, Martin (Penn State University) and Rebecca Duggan (Parks Canada Agency)

[260] *A Comparison of Dog Shoulder Height in European and Native American Contexts*

Dogs are the only domestic animal to have existed on both sides of the Atlantic Ocean prior to the Columbian Exchange. Historic documents indicate that European colonists to North America brought their own dogs and generally preferred large breeds capable of protecting livestock, hunting, and defending settlements from both predators and Native American raids. As early as 1619 the Virginia Assembly banned colonists from trading European dogs to Native Americans, and these policies were quickly adopted in many colonial legislatures, remaining in effect until the 1700s. We compare morphometric data from a sample of over 200 individuals from sites in Europe and the American colonies dating to between AD 1000–1800, and Native American contexts in Eastern North America spanning the last 6,000 years. Though many indigenous breeds were eventually influenced by admixture, our analysis identifies noticeable differences in dog's average shoulder height, supporting assertions that many breeds introduced by European colonists were significantly larger than local Native American breeds at the time of contact.

Wellman, Hannah (University of Oregon)**[387]** *Applied Zooarchaeology and Oregon Coast Sea Otters (Enhydra lutris): Following Up on Lyman 1988*

The sea otter (*Enhydra lutris*) was nearly driven to extinction on the Pacific Coast in the nineteenth century due to intensive commercial hunting and the maritime fur trade. Despite some successful reintroduction efforts in North America, the Oregon sea otter population remains locally extirpated and listed as endangered. One aspect of Lyman's 1988 study examined precontact sea otter teeth from Oregon and found they were similar in size to modern California sea otter teeth, and smaller than modern Alaska sea otter teeth. These geographic groupings were later confirmed by an ancient DNA study. I revisit this hypothesis with substantially larger sample sizes of teeth, as well as new data on humeri and femora. Sea otter tooth width and long bone dimensions vary significantly along a latitudinal cline from California to Alaska. Specific, inter-state comparisons of tooth width and long bone measurements do not support the hypothesis that precontact Oregon sea otters are more similar to those from modern California than they are to those from modern Alaska. These data show that morphometric analyses can be used to answer research questions about species distribution and demography, but with less detail regarding inter-state relationships than originally postulated.

Wells, Joanna (University of Alaska Anchorage), Kathryn Krasinski (Adelphi University), David Yesner (University of Alaska Anchorage) and Fran Seager-Boss (Knik Tribal Council)**[194]** *Traditional Dena'ina Land Use at the Cottonwood Creek Village Site, Southcentral Alaska*

The Dena'ina and Ahtna developed a sedentary socioeconomically-stratified lifestyle with material inequality by the time of European contact. The development of permanent villages indicates a shift into a complex society with qeshqas (leaders) who had better food, larger houses, and more wealth. Semisubterranean depressions at Cottonwood Creek, ranging from 802 years cal BP to modern age, are remnants of storage and house pits still present on the landscape. Geochemical testing of sediments has the potential to reveal specific storage pit contents associated with feature shape and size. In conjunction with radiocarbon ages and house style, this poster investigates the development of differences in material wealth as it relates to salmon harvesting.

Wells, Joshua J. (Indiana University South Bend)**[227]** *Waist Deep in the Big Data: How the Digital Index of North American Archaeology (DINAA) Implements Ontological and Loosely Coupled Organization around the Construct of the Archaeological Site*

Archaeology's disciplinary engagement with big data is confounded by the variety of information types recorded, variability of data due to differential preservation of materials and theoretical orientations of observers, and complexity of archaeological concepts daring to be caged in explicit digital expressions. The Digital Index of North American Archaeology (DINAA) is a linked open data hub, centered around the theoretically, practically, and interpretively fraught definition of "archaeological site," nevertheless a foundational concept in archaeological science. To develop big data from hundreds of thousands of archaeological site definitions gleaned from numerous incompatible systems of nomenclature and investigative frameworks, DINAA employs strategies of aggregated ontological definitions within DINAA and loose coupling to related informational resources outside it, often achieved via fairly standard intelligence key identifiers (i.e., Smithsonian trinomials and similar). This practice requires explicit and critical consideration of what DINAA's big data elements "mean" in their original contexts as well as what else they might "mean" in combination in DINAA or to external investigators. The intellectual labor is not trivial, but is tractable, and exemplifies a replicable process for engaging other concepts of interest to archaeologists (artifactual categories, stylistic components, cultural horizons, etc.), operationalizing archaeology's complexity in pursuit of big data.

[256] Moderator**[195]** Chair

Wells, Joshua J. [18] see DeMuth, R. Carl

Welton, Lynn (University of Chicago)**[171]** *The Pre-Aksumite Period in Eastern Tigrai: The Chronology and Stratigraphy of the Site of Mezber*

The current understanding of the Pre-Aksumite period of northern Ethiopia has been heavily influenced by data originating from sites in western Tigrai, particularly those in the area of Aksum. The Eastern Tigrai Archaeological Project (ETAP), however, has also documented substantial evidence for Pre-Aksumite settlement further to the east, through both survey and excavation. This paper will summarize ETAP's efforts to understand the Pre-Aksumite period in eastern Tigrai at the site of Mezber, a small rural center of just under 1 ha in size. Although the site was likely in use as early as 1600 BCE, there are two major Pre-Aksumite periods of construction and occupation at the site, the first dating to between 850–750 BCE, and the second from approximately the sixth–first centuries BCE. There is also evidence of limited post-occupational use of the site around the eighth century CE. By focusing on deep soundings excavated in Areas A and C at Mezber, this paper will examine the long-term history of occupation at the site and the contributions it makes to the understanding of the indigenous development and continuity of social complexity in the Horn of Africa.

Wendrich, Willeke (UCLA)**[70]** *The Hidden Costs of Archaeology*

Archaeologists have realized for a long time that in the struggle to fund field work, working on publications and the cost of publishing archaeological results are often not covered. With the increase in digital recording and digital publishing this problem is not solved. On the contrary, it is exacerbated by a number of additional tasks and responsibilities. These range from a changing publication model, where open access is becoming increasingly important, and journals request payment to make articles freely available to payments to data archives. Added to that are the costs in time, or in paying salary for the many additional hours that need to be spent on data cleaning and the inclusion of proper metadata with the many file types that make up a modern record of an archaeological area. Publishers are experimenting with different models to include data and there is an expectation that these will be made available for free as well. The other type of costs is more virtual: all the work on collecting, cleaning and publishing data should be recognized as research in itself, and this requires an investment in time, energy and reputation from archaeologists who are in the position to do so.

[309] *Discussant***Wendt, Carl (Cal State University—Fullerton)****[278]** *Olmec Households in the Context of Sociopolitical Transformation*

The Olmec are among Mesoamerica's earliest civilizations and as such they provide a good opportunity to investigate household change in the context of developing social inequalities. Over the past few decades archaeologists have gathered household data that show the ways they transformed and remain unchanged during periods of social evolutionary change. Artifact assemblages and subsistence patterns are examined and together provide valuable insights into domestic reorganization and transformation. Comparing how change occurred at different scales and domains shows that social evolutionary transformations vary across different levels of society, which highlights the importance of investigating a range of domains and contexts.

Weniger, Gerd Christian [165] see Bradtmöller, Marcel

Werkheiser, Marion
[206] *Discussant*

Werner, Angelia [40] see Eren, Metin

Werner, Joseph (University of Alberta)
[55] *Multiple Functions for an Assemblage of Middle Stone Age Points: Use-Wear Evidence from Magubike Rockshelter, Tanzania*
Preliminary lithic use-wear evidence from Magubike Rockshelter, Tanzania, suggests a mixed function for an assemblage of Middle Stone Age points, including a possible projectile point role. The development of hafted hunting weapons during the Middle Stone Age is thought to have marked a major juncture in human behavioral evolution. Not only did the emergence of this technology likely have a major impact on the foraging strategies of hunting and gathering populations, many have speculated that the composite nature of these weapon systems reflects an important improvement in the cognitive abilities of contemporaneous Pleistocene hominins. Nonetheless, one of the primary challenges in understanding this process and its significance has been identifying and demonstrating the function of pointed artifacts. In this paper, the author makes use of a newly developed use-wear technique that relies on plotting edge damage distribution using GIS software. This method is combined with a more conventional means of high-velocity impact detection to reconstruct possible tool uses. These results reinforce the notion that pointed artifacts, sometimes assumed to be exclusively projectile points, likely assumed a variety of purposes.

Werness-Rude, Maline (Ventura College) and Kaylee Spencer (University of Wisconsin–River Falls)
[204] *Maya Architecture in the Northern Lowlands*
It has long been recognized that ancient Maya architecture encoded sacred ideologies and replicated primordial landscapes through building forms and structural orientations. Many studies have focused on the architecture of the Southern Maya Lowlands, where rich textual sources exist and where an abundance of archaeological data aids in efforts to understand and interpret the meanings of architectural groups. We seek to augment interpretive frameworks with respect to the Northern Maya Lowlands, rather than just applying already existing models to new material. Indeed, northern built environments cannot be seen as carbon copies of southern ones nor can they be understood simply as late derivations from, and/or modifications of, southern ways of thinking about building. Looking at such constructs thus also has the potential to expand our awareness regional variation and specificity. In this paper, we build upon our work concerning northern architectural spaces by considering site orientations, plaza arrangements and sculptural embellishments. While we will focus on the northeastern, Puuc, region, we include sites from northwestern Yucatán and the north-south 'buffer zone,' which also allows us to revisit and reexamine old, conceptual divisions between the Puuc and adjacent areas in the scholarship.

Wernke, Steven A. (Vanderbilt University)
[75] *Irreducible Reducción: Archaeological Microhistory at Mawchu Llacta, a Planned Colonial Town in Highland Peru*
The Reducción General de Indios (General Resettlement of Indians) in the Viceroyalty of Peru brought about one of the largest mass resettlement programs ever enacted by a colonial power, forcibly displacing some 1.5 million native Andeans to compact towns (reducciones) built around plazas and churches. As a colonial utopic project, the Reducción was to remake the Andean world in the ideal self-image of Spanish civic and religious community. As materialized manifestations in the Andean countryside, reducción towns were deeply compromised and ambivalent in their significance and effects: they attempted to reduce the irreducible complexities of community. This paper presents an overview of findings from extensive excavations in domestic and ritual contexts at a large, unusually well-preserved and textually-documented reducción, Santa Cruz de Tuti (known today as Mawchu Llacta). With an occupation spanning Inka through early republican times, Mawchu Llacta promises to shed light on continuity and change in the domestic and ritual practice over more than three centuries of successive imperial rule. Through an archaeological microhistory approach, interdisciplinary research at Mawchu Llacta explores the tangible and mutual transformation of global and local practice through colonialism and the emergence of modernity.
[75] *Chair*

Wernke, Steven A. [75] see Downey, Jordan

Wesp, Julie K. (American University)
[329] *(Re)integrating Cultures at Cacalchen: Recent Excavations at Two Rural Chapels in Central Yucatán*
The arrival of Europeans to the Americas in the sixteenth century forever changed processes of cultural integration. This paper explores how small Maya communities in Central Yucatán navigated the process of integration of new religious practices and the use of preexisting structures in the landscape. This examination stems from recent excavations of two different rural chapel structures at the site of Cacalchen, located in the greater Yaxuna region between the towns of Yaxcabá and Kancabdzonot. While new permanent structures were created to fulfill the needs of a changing religious practice, spaces were chosen that already had important symbolic meaning to the local population. The remote location of these chapels likely meant that there was not a permanent European presence at Cacalchen during their use which may have resulted in a disintegration of new cultural practices. This research illustrates how landscape participates in social disintegration, as well as integration, when occupied by two distinct cultures that had previously not been in contact. Cacalchen emerges as a space in a constant process of re-integration that continues well into the present day.
[64] *Discussant*

West, Catherine F. (Boston University)
[144] *Birds of a Feather? Bird Conservation and Archaeology in the Gulf of Alaska*
Gulf of Alaska islands provide habitat for substantial populations of both seabirds and migratory waterfowl, which have been under threat from mammal introductions and landscape degradation for more than 200 years. Bird management drives decisions in this island region and focuses on the eradication of invasive species and restoration of island landscapes to their "natural" state. However, given that people and climate have influenced these landscapes for thousands of years, we ask: how do we determine a baseline for this restoration? Using a combination of zooarchaeological data and contemporary bird observations on Chirikof Island, Alaska, the results of this project provide a historical perspective of changing bird biodiversity that can be used to inform contemporary conservation, landscape reconstruction, and illustrate the challenges of applying long-term archaeological data to contemporary environmental problems.

West, Catherine F. [144] see Huston, Melyssa

West, Frankie (University of Tennessee, Knoxville), Stephen Yerka (University of Tennessee, Knoxville), Joshua J. Wells (Indiana University, South Bend), Eric Kansa (Open Context) and Sarah Whitcher Kansa (Alexandria Archive Institute)

[195] *DNA Linkage: Incorporating North American Ancient DNA Data into DINAA*

Genetic data, especially from ancient samples, is frequently incorporated into modern archaeological analyses. Concurrently, sequence data from genetic/genomic research in the United States is increasingly available through open-source context from the National Center for Biotechnology Information (NCBI). However, in spite of the accessibility of recently published genetic data, there currently is no comprehensive database exclusively for North American ancient DNA samples, nor is there comprehensive archaeological data associated with NCBI data. Here, we pilot the integration of published North American ancient DNA sequence data from NCBI into the Digital Index of North American Archaeology (DINAA). By building links from ancient DNA sequences in NCBI to site-based information in DINAA, we incorporate data from a variety of archaeological sources. In addition to creating a useful resource for molecular anthropologists to access information on North American ancient DNA samples, the integration of DNA data into the DINAA toolbox provides a more comprehensive view of archaeological site data in an Open-source context, facilitating the sharing, exchange, and publication of archaeological information.

Westphal, Hildegard [223] see Müller, Peter

Weyrich, Laura (University of Adelaide)

[143] *Alterations in South American Oral Health through the Colonial Period: The Story of Ancient DNA Trapped within Dental Calculus*

Interpreting the evolutionary history of bacterial communities within the human body (microbiota) is key to understanding the origin of many modern diseases. The link between humans and their microbiota can also be exploited to examine and track the extent and severity of human adaptation to the environment and impacts on health. Here, we utilize a shotgun sequencing approach to examine ancient DNA preserved within dental calculus from a wide range of ancient South Americans (n = 162). Well-preserved specimens revealed remarkable microbial diversity in South Americans prior to European arrival. In fact, nearly all observed South American oral microbial diversity fell outside of known ancient and modern European diversity. The patterns observed within microbiota reflected human mitochondrial DNA distribution, and reflected cultural continuity, rather than human replacement, in several locations, similar to the mitochondrial DNA from the same individuals. We also identified unique oral microbial taxa present within South Americans, and can track changes within these species as Europeans arrive, with the potential downstream health-impacts. Consequently, ancient oral microbiota provides a wealth of cultural and anthropological information about the past, which is critical to identify events that altered human health and history.

[143] *Chair*

Weyrich, Laura [143] see Harkins, Kelly

Wharton, Robin [18] see Glover, Jeffrey B.

Wheelbarger, Linda (San Juan College)

[104] *Point Pueblo, a Great House Community in the Middle San Juan*

San Juan College field school excavations at Point Pueblo in Farmington, New Mexico, have revealed a great house with attached great kiva constructed of both local vernacular and stylized Chacoan Type II architecture. Extensive early southern influence, AD 850–1050, is based on the dominant presence of Red Mesa Black-on white pottery. The great kiva floors demonstrate a continuous ritual placement of artifacts subsequent to a major ritual remodeling event of the floor and roof support piers, apparently completed in the late AD 1100s. A large pit containing over 600 sherds present at the southern edge of the great kiva interior may have been used for communal offerings. A new type of great kiva floor feature was discovered on the remodeled floor wherein a horizontal arch of cobbles set in clay was constructed extending out from the northern and southern ends of the remodeled eastern Chacoan roof support piers. Numerous small to medium pit features were constructed on the remodeled floor and then capped before use of the great kiva continued through to the end of the AD 1200s. Point Pueblo exemplifies ritual complexity of the Middle San Juan region during the Chacoan time period.

Wheeler, Arlene

[228] *Discussant*

Wheeler, Jessica [329] see Stanton, Travis

Whelan, Carly (California State University, Chico)

[381] *The Viability of Long-Distance Acorn Transport in Eastern California*

The ethnographically documented Mono Lake Paiute of Eastern California regularly crossed the Sierra Nevada to procure acorns from Yosemite Valley; a total journey of fourteen days. It is not clear whether such trips are economically efficient in their own right, or were undertaken as components of social excursions to visit and trade with the Yosemite Me-Wuk, or as journeys of necessity in years with poor piñon pine nut harvests. To evaluate the economic productivity of procuring acorns from Yosemite, relative to collecting resources in the Mono Basin, we use previously published data to calculate the mean return rates for collecting and transporting basket loads of various staple foods to a winter camp location. We also calculate the standard deviation of each return rate, taking into account the variance present in published estimates of the caloric content of resources, collection and processing times, packing density, and basket volume. The results indicate that while acorn procurement trips to Yosemite are less productive than collecting piñon pine nuts and Pandora moth caterpillars in the vicinity of Mono Lake, they compare favorably to collecting small seeds. This suggests that long-distance acorn transport was a viable subsistence strategy for the hunter-gatherers of Mono Lake.

Whisenhunt, Mary (University of Texas at San Antonio)

[303] *Survey in the York-Duncan Valley, Arizona: Understanding Patterns of Mogollon Population Aggregation and Dispersal*

This research project examines prehistoric population aggregation and abandonment processes by analyzing how communities in Arizona's York-Duncan Valley nucleated, and then dispersed in or abandoned the region from the end of the Early Agricultural period to the Salado period. The Upper

Gila River Valley offers a unique opportunity to understand these dynamics. The research explores the interplay of ecological and demographic pressures within a resilience theoretical framework. I suggest that community aggregation initially offered competitive advantages which enhanced social robustness, but eventually introduced social and ecological vulnerabilities. This hypothesis will be evaluated, in part, by the survey and recording of sites in the understudied York-Duncan Valley. Survey will focus on agriculturally productive locales most likely to have hosted prehistoric groups, based in part on results from two Geospatial Information System predictive models for prehistoric habitation in the York-Duncan Valley. Variables include a variety of ecological factors and settlement patterns from Early Agricultural to late prehistoric periods in the Mimbres, northern Rio Grande, and Upper Gila River Valleys. Model outputs are then compared to known prehistoric sites in the study area in order to evaluate the methodology.

Whisenhunt, Mary [303] see Corl, Kristin

Whitaker, Adrian (Far Western Anthropological Research Group, Inc.)

[383] *Social Boundaries and the Cultural Ecology of Artiodactyl Hunting in Prehistoric Central California*

We use a model developed using Geographical Information Systems software to examine the extent to which the suitability of habitat surrounding archaeological sites in Central California affected hunting decisions for three artiodactyl taxa: elk (*Cervus elaphus*), deer (*Odocoileus hemionus*), and pronghorn (*Antilocapra americana*). Model findings are compared to a database of 100 archaeofaunal assemblages from the same area. We find that the model predicts the presence and relative abundance of elk fairly well but underestimates these same measures for deer and overestimates them for pronghorn. Two causes of the disagreement between model predications and data are offered. We reject resource depression of pronghorn or elk as the cause of greater-than-expected deer hunting as there is no decline in relative abundances of either through time. However, we find that the herding behavior of pronghorn and elk, coupled with social circumscription of hunters during the Late Holocene, may have limited hunting opportunities for elk and pronghorn, leading to the ubiquity and abundance of deer bone observed in the record. The increased importance of deer as opposed to elk and pronghorn hunting is attributed to the establishment of territoriality in the region during the Late Holocene.

[383] *Chair*

Whitaker, Adrian [381] see Byrd, Brian

White, AJ (California State University Long Beach), Lora Stevens (California State University Long Beach) and Varenka Lorenzi (California State University Long Beach)

[354] *A 1,000-Year Record of Cahokia Region Population Change through Fecal Stanol Biomarker Analysis*

Determining the timing and magnitude of Cahokia's demographic rise and fall is crucial to understanding the reasons for its advance and collapse. Fecal stanol biomarker analysis is an emergent geoarchaeological method that may provide a more direct record of Cahokia region population change than previous population estimates. This study analyzed sediment from Horseshoe Lake, Illinois, for fecal stanol content to establish a population proxy of the Cahokia region. The stanol record indicates Cahokia region population increased during the Terminal Late Woodland (AD 900–1050), declined during the Stirling phase (AD 1100–1200) and continued to approximately AD 1400, confirming previous population estimates. The study is the first to provide continuous demographic information from Cahokia's founding to the historic period. The results of this study suggest biochemical indicators may be used alongside traditional archaeological data to evaluate past demographic events.

White, Chantel (University of Pennsylvania)

[27] *Naomi F. Miller and Applied Paleoethnobotany of Southwest Asia*

Naomi F. Miller's work exemplifies the paleoethnobotanical approach toward understanding human interactions with botanical landscapes in the past using archaeological remains, rooted in theoretical traditions of American anthropological archaeology. On the occasion of her Fryxell Award in Interdisciplinary Research from the SAA, we reflect on her body of published research and active fieldwork to draw out five themes that highlight areas in which Miller has made significant contributions to the field. These include 1) interpretation of archaeobotanical deposits (best exemplified by her insights into the use of animal dung as fuel); 2) quantitative methods for archaeobotanical data analysis; 3) regional synthesis of archaeobotanical datasets to reconstruct environmental and agricultural change through time; 4) integration of botanical datasets with textual and iconographic evidence for plant use, as well as parallel lines of archaeological inquiry (e.g., faunal analysis); and 5) the conservation of archaeological sites via modern plant management strategies. We emphasize the influence of Miller's work on the next generation of scholars in paleoethnobotany, both within and beyond Southwest Asia.

[27] *Chair*

White, Devin [130] see Dungan, Katherine

White, J. Alyssa (University of Oxford), Rick J. Schulting (Institute of Archaeology, University of Oxford), Peter Hommel (Institute of Archaeology, University of Oxford), Vyacheslav Moiseyev (Peter the Great Museum of Anthropology and Ethnogr) and Valeriy I. Khartanovich (Peter the Great Museum of Anthropology and Ethnogr)

[330] *Stable Isotopic and Radiocarbon Analysis of Neolithic and Bronze Age Fisher-Hunter-Gatherers from Lake Baikal's Little Sea, Upper Lena River, and Selenga River Regions*

The diet of prehistoric hunter-gatherers in the Lake Baikal Region has been extensively studied using stable carbon and nitrogen isotopic analyses. This paper extends this work, reporting new carbon and nitrogen stable isotope and AMS radiocarbon dating results from the cemeteries of Verkholsensk (n = 45) in the Upper Lena micro-region; Ulan-Khada II–V (n = 19) in the Little Sea micro-region; and Fofanovo (n = 22) in the Selenga micro-region. The latter analyses represent the first stable isotopic data from the eastern side of Lake Baikal. Our results revealed several interesting patterns: Late Neolithic and Early Bronze Age individuals at Verkholsensk were significantly different from each other in $\delta^{15}\text{N}$ (n = 41, df = 39, p = 0.000), suggesting a more terrestrial diet in the latter. Children to young adults differed significantly from mid to old adults at Ulan-Khada in $\delta^{15}\text{N}$ (n = 12, df = 10, p = 0.009), the latter showing depleted ^{15}N values. The results from Fofanovo appear isotopically distinct from the other micro-regions as a result of heavy reliance on the Selenga River's resources. At Fofanovo in particular, there were discrepancies between the radiocarbon results and expected archaeological datings. In the future, it will be necessary to establish appropriate freshwater reservoir corrections for sites along the Selenga.

White, Joyce (University of Pennsylvania Museum) and Elizabeth Hamilton (University of Pennsylvania)

[271] *Applying a Life History Framework to Analyzing Metal Age Metal Assemblages from Thailand*

Application of archaeometric techniques to metals and related evidence from prehistoric sites in Southeast Asia is in its infancy. One result is that sample sizes per site have in most cases been minute or even unspecified, although in rare instances, such as Ban Chiang, sample sizes for metallographic and elemental analyses have been more robust and representative. Small sample sizes obscure key evidence for intrasite and regional

variability in technological and economic systems. Recent lead isotope analyses of copper-base artifacts from Thailand and Laos illustrate the potential for fine-grained study of metals assemblages, revealing that different sites had separate supply networks for copper at different periods of time. If our field is to contribute meaningfully toward the study of material culture in past economies and the reconstruction of technological systems in terms of chaînes opératoires, the field must raise the bar in terms of many sampling issues. Not only are larger samples required for plausible reconstructions, but complete assemblages must be assessed, not just a handful of idiosyncratically selected intact artifacts from single context types (usually graves).

White, Kirrily (University of Sydney)

[20] *Large, Dispersed, Occupation Aggregates in Prehistory: A Global Comparative Analysis*

There is no agreement as to how very large, dispersed, occupation aggregates in prehistory such as the Trypillia megasites (fourth millennium BCE), Chaco Canyon (ninth–twelfth centuries CE) and the sprawling Neolithic settlements of the Middle Yangzi (third millennium BCE) should be classified in archaeology. Often these sites behaved very differently to the large, higher-density settlements with which they are sometimes compared. The aim of this research is to look at material and spatial patterns in the formation, development and demise of these dispersed, occupation aggregate sites on a global comparative scale to understand how they fit into broad patterns of human settlement behavior in the past. By contextualizing changing occupation patterns over time in regional technological development, it becomes apparent that within this form of settlement there is very little change in local spatial and material operation when compared to their smaller predecessors and contemporaries. Comparing these patterns and technologies globally, it is possible to hypothesize that human groups used low occupation density and, in part at least, mobility within long-standing regional and supra-regional traditions of building and trade as the most common ways of managing population increase and the most extensive occupation aggregates their regions had ever seen.

[76] *Chair*

White, Nancy (University of South Florida)

[393] *Long-Distance Connections across the Southeastern United States and Mesoamerica*

Despite over a century of research, unquestionable evidence of routine and sustained interaction/communication between the U.S. Southeast and Mesoamerica remains elusive. Similarities in iconography and ritual are very general, possibly ancient. Mexican obsidian and tropical plants occur rarely and only at the outskirts of the Southeast, while earthen mounds and some Mississippian-like artifacts occur on the northern Mexican Gulf Coast. The most glaring (absence of) evidence is the lack of products such as cotton and especially alcohol in the Southeast. Both environmental and cultural processes must account for what was sporadic and limited interaction.

Whitehead, William (SWCA Environmental Consultants)

[287] *Recent Work in Southeast New Mexico by SWCA: The Impact of TRU Analysis on How We Define Site Boundaries*

SWCA has performed seven data recovery projects in southeast New Mexico between 2015 and 2016 with TRU (Transect Recording Unit) surface survey, collections and analysis. Notable sites have included an archaic pit house structure, a bedrock mortar site and several coppice and parabolic dune sites. A summary of the excavation work will be presented, focusing on highlights from three of these sites. The results of TRU surface collection and analysis will be presented in conjunction with excavation data at six of these sites. We find that TRU surface survey and collection gives much better spatial definition for drawing site boundaries, defining activity areas, and excavation area selection. However in southeast New Mexico, with the majority of sites under some form of sand sheet, TRU analysis alone will not give perfect reconnaissance of subsurface feature areas. We propose that mechanical scraping, shovel tests, trenching and TRU surface analysis is the best way to understand surface to sub-surface site patterning. Recommendations for using TRU surface survey in relation to several New Mexico agency site definitions and reporting criteria will also be presented.

Whiteley, Peter [130] see Watson, Adam

Whitesides, Kevin (University of California Santa Barbara)

[212] *The Highest Common Factor: Heterodox Archaeology and the Perennialist Milieu*

Introducing a 1944 translation of the Bhagavad Gita, Aldous Huxley concisely described what he called the Perennial Philosophy. Despite the apparently distinct cultures of the world, he said, “beneath the confusion of tongues and myths, of local histories and particularist doctrines, there remains a Highest Common Factor.” This perception of an underlying unity among the “higher religions” of the world has led Perennialists to feel a greater sense of ownership and hence freedom in interpreting the significance of major archaeological sites the world over. Unlike alternative archaeological narratives that focus on particular geographical and cultural identities, Perennialism opens the doors to all cultures and all times, though there is a strong tendency toward reverence for the past (or contemporary “shamanic” cultures deemed to model the past). This Perennialist stance undergirds much of contemporary alternative spirituality and, although it claims a timeless authority it is, itself, a temporally located and particularist set of religious positions that can be historically and socioculturally contextualized. It is, in fact, the broader “cultic milieu” in which all of these heterodox themes circulate that can allow us to make sense of the cognitive and social contexts in which the impulses to create alternative archaeological narratives arise.

Whitley, David (ASM Affiliates, Inc.)

[28] *Agency, Structure, and the Neoliberal Turn*

Recent theoretical over-emphasis on human agency and denial of the significance of sociocultural structure presents a radical challenge to a century of research. It implies that Durkheim, Boas, Weber, etc., are irrelevant, and that long-standing structures of inequality (e.g., of gender or race) somehow do not exist or are not important. Examination of recent human-agency studies illustrates that, instead of studying human agency as action, interpretations are based on the kinds of structures whose existence is denied, meanwhile neither addressing nor resolving the analytical problems raised by this approach originally identified by Giddens, nor accommodating our current understanding of human cognition, including embodiment. Worse, the assumptions about human life mirror those promoted by neoliberal political-economic theory, introduced by Reagan and Thatcher, which portrays any kind of governmental (i.e., structural) control as necessarily deleterious, in favor of the supremacy of near-uncontrolled individual rights. This demonstrates that noncritical archaeology theory can have pernicious even if unintended consequences, in this case supporting the neoconservative ideology that has become the worldview of the West. Natural models, as durable analogical and metaphorical sources for belief and symbolic systems, are argued to be useful sources for archaeological research on religion.

Whitley, Tamara (Bureau of Land Management)

[300] *Tribal Collaboration in Heritage Management on the Carrizo Plain National Monument*

The Carrizo Plain National Monument (CPNM) contains some of the most significant Native American heritage sites in the United States. In recognition of this, a cultural landscape, which includes habitation sites, camps, quarries and pictograph sites, has been designated as the Carrizo Plain Archaeological District National Historic Landmark. In addition to these physical features, the Carrizo Plain is imbued with intangible values that embody

a sacred landscape for affiliated tribes. The Bureau of Land Management has worked closely with tribal partners during the development of management plans for the CPNM. This has included an adaptive management strategy for public visitation of Painted Rock, a sacred pictograph site. This poster will provide information on how site management at Painted Rock has been guided by this collaborative process.

Whitley, Thomas (Sonoma State University)

[186] *Droning on a Budget: UAVs, Aerial Imagery, and Photogrammetry for the Archaeologist*

Recent changes to the FAA regulations covering the use of Unmanned Aerial Vehicles (UAVs) or “drones” have clarified their use in both research and commercial operations. This paper is intended to provide an overview of low-cost entry into the use of UAVs for archaeological projects and considerations for applications in aerial imagery, videography, and photogrammetry. Using drones for documentation and interpretation is no longer uncommon, but it has been cost-prohibitive since the previous regulations required full pilot licensing or were ambiguous. By gaining a little bit of knowledge and experience, now even graduate students with little funding can find opportunities to employ these devices on their own research projects. Some examples will be provided along with a discussion of what the future holds for UAV technology.

Whitlock, Bethany and Kari Lentz (Sonoma State University)

[75] *A Rectory Divided: Mediation of Space in a Colonial Town in the Southern Peruvian Highlands*

During the sixteenth century Viceroy Toledo ordered a series of reforms in the Viceroyalty of Peru that involved the forced resettlement of the native population into planned nucleated settlements (reducciones). Toledo believed that these standardized built environments, in conjunction with ecclesiastical regulation, would produce idealized colonial communities. This paper presents the initial results of recent excavations in the rectory at Mawchu Llacta, a reducción in the Colca Valley. The rectory served as the dwelling for the parish’s clergymen during its three centuries of occupation. The interior organization of the rectory was distinct from that of other domestic structures in the settlement, and underwent significant modification during its occupation. One room, for example, was divided into clear public/reception and private spaces. As such, we focus on temporal changes in the structure and organization of the rectory, including the reuse of Inka architectural elements. We also consider historical documents pertaining to the rectory, and examine the differences between these and the archaeological evidence. Ultimately, we explore how priests, agents of colonial authority, mediated power through control of space. We also intend to investigate how the lived experiences of indigenous Andeans and colonists, such as clerics, differed during the colonial period.

Whitney, Kristina (University of New Mexico)

[346] *Landscape Use in Southeastern Ethiopia*

The widespread availability of satellite data has opened up parts of the world that have long been inaccessible for archaeological research. One such area is the border between Ethiopia and Somalia, which has been embroiled in civil conflicts for the past 30 years. As such, little is known about the cultural heritage of southeastern Ethiopia and the greater Somalia region. This project shows how using geographic information systems (GIS) as a form of initial survey can reveal substantial results while minimizing personal risk to the researcher and maintaining cost effectiveness. The research goal was to understand how modern villages and surface anomalies relate to each other and to the landscape through analyzing satellite imagery at a scale of 1.19 m per pixel. Topographic features, such as drainages and landscape position, were analyzed in relation to identified villages and surface anomalies to analyze continuity in landscape patterning. This information was then used to estimate the length of time these anomalies may have been present on the landscape with three models. Even though ethnographic data are sparse, I conclude that longer estimates of habitation by pastoral groups in southeastern Ethiopia fit with the known data.

Whitridge, Peter (Memorial University of Newfoundland)

[35] *Manufacturing Reality: Inuit Harvesting Depictions and the Domestication of Human-Animal Relations*

Schematic harvesting scenes incised on tools are a stock variety of both precontact and historic Inuit graphic art. They sometimes seem to depict historically specific events, which they effectively commemorate, and have real (sometimes precise) informational content that must have been important for the dissemination of technical harvesting knowledge among a hunter’s peers, and its inter-generational transfer. However, the harvesting setups—such as a boatload of hunters on the verge of harpooning a whale—are rather conventional, even repetitive, suggesting that these depictions also acted to discursively stabilize particular sorts of relations among people, things, the environment, and nonhuman animals. This may have been an intended function, along the lines of a hunting amulet, or it may have been an unconscious effect achieved through the eidetic citation of an idealized turn of events. Although scenes of harvesting walrus, caribou, birds, fish and other species occur in this idiom, bowhead whaling was clearly the object of a special fascination. Whaling scenes are the most conventional of all, condensing these various functions—historical, educational, symbolic—as they engaged whales in a discourse on human-animal relations that embraced ritual, belief, memory, social relations, technology and economy.

[35] *Chair*

Whittaker, John (Grinnell College), Daniel Lee (Grinnell College), Lee Sharpe (Grinnell College) and Jeffrey R. Ferguson (University of Missouri)

[88] *Sources of Sinagua Obsidian Points and Debitage: XRF Analysis*

Projectile points and debitage from three Sinagua sites in northern Arizona were analyzed using the XRF instruments at Missouri University Research Reactor. The rooms at Lizard Man Village, Fortress Hills, and New Caves were occupied between AD 1050 and 1250. Over 300 obsidian points and debitage were analyzed using an ARL Quant’x EDXRF Spectrometer. The primary source of obsidian is the well-known Government Mt source, with a few samples from RS Hill and other sources. The nearest sources of abundant obsidian were heavily used, but our data allow us to look at changes through time in northern Sinagua obsidian use and point typology.

Whitten, Ashley (University of Kentucky) and David Chicoine (Louisiana State University)

[231] *Architecture and Spatial Organization of Urban Cercaduras at the Early Horizon Center of Caylán, Nepeña Valley, Peru*

This poster presents architectural and spatial data from monumental urban compounds or cercaduras at the Early Horizon center of Caylán (800–1 BC), Nepeña Valley, Department of Ancash, Peru. Caylán is interpreted as the primary center of a multi-tiered polity that developed in the littoral portion of the Nepeña Valley and reached its peak during the second half of the first millennium BC. Recent fieldwork at Caylán revealed the existence of more than 40 cercaduras interpreted as multifunctional residential compounds. The cercaduras are articulated through more than a dozen streets. Area excavations and systematic pedestrian surveys provide significant data to explore the organization of the cercaduras including their size, complexity, depth, and overall variability. Results indicate that the urban cercaduras share spatial logic, in particular with respect to their access patterns and subdivisions. Here, we analyze architectural data from a spatial syntax perspective with the objective of reconstructing the size and complexity of the co-residential groups at Caylán. We present detailed reconstructions of six of the better preserved cercaduras to bring insights into Early Horizon urbanscapes and demographics. The results are discussed in light of the increased complexity and potential socioeconomic diversity of human settlements in coastal Ancash during the Early Horizon.

Whitten, Ashley [320] see Pool, Christopher A.

Wholey, Heather (West Chester University)

[216] *The Mid-Atlantic Steatite Belt: Archaeological Approaches to Traditional Knowledge and the formation of Persistent Landscapes*
In the Mid-Atlantic, steatite outcrops within the eastern talc belt, which runs from Alabama, through New England to Labrador. It is a porous, carvable stone with a mineralogical and chemical makeup that inhibits soil formation, resulting in scrub or barren landscapes that host rare grasses and wildflowers. In their natural state, these would be striking landscape features. While an array of items, such as plummets, bannerstones and pipes, were produced from steatite throughout precolonial times, the craft of carving open vessels peaked during the Transitional Period. Though several locales may supply steatite, only some appear to have been used for extraction, and finished vessels are found up to 300 km from these source locations. Traditional knowledge about the environment is often observable to us through ethnography, local toponymy, or oral history. Much of the Mid-Atlantic region lacks access to these rich sources. Yet traditional knowledge is also manifest in the physical construction of persistent landscapes as people visit and revisit places, infusing them with meaning and memory. This work addresses how archaeology helps to understand how people developed traditional knowledge of resources in the past, and how archaeology may be a partner in the contemporary cultural reimagining of relict landscapes.

Wholey, Heather [224] see Nash, Carole

Whyte, Thomas

[160] *Big Meat Feasting in the Pisgah Phase of Western North Carolina.*

Animal remains from three late prehistoric Pisgah phase sites in mountainous western North Carolina are described and compared. The sites include a mound (Garden Creek Mound No.1) and adjacent village, and a village with no mound (the Cane River Middle School site). Deer, black bear, turkey, and box turtle remains dominate all three assemblages. Three large bones from the mound, previously reported as bones of Bison, are definitively Elk. Whole large mammal bones, recovered almost exclusively from the mound, are interpreted as evidence of lavish feasting. In contrast to Mississippian faunal assemblages from the adjacent lowlands, evidence for food resource competition or scarcity is lacking in the central Appalachian Summit highlands.

Whyte, Thomas [385] see Lapham, Heather

Wichlacz, Caitlin (Arizona State University) and David Abbott (Arizona State University)

[335] *Testing Alternative Settlement Models at Las Colinas with Polychrome Dating*

An understanding of the nature of late Classic period settlement at Las Colinas is an important element in understanding the broader social changes that took place across the Phoenix Basin during this time. One perspective on settlement at Las Colinas figures prominently in the recent "core decay" model proposed for the Phoenix Basin Hohokam. In response to this model, we propose new alternative scenarios for late Classic period settlement at Las Colinas. We test these alternative settlement models through an examination of ceramic data, principally from the polychrome pottery that appears in the Phoenix Basin during the late Classic period as a sign and signature of new social arrangements. Finally, we discuss the implications of our study for broader understandings of social change and settlement dynamics in late Hohokam prehistory.

Wickeret, Andrew [48] see Monteleone, Kelly

Wickler, Stephen (Tromsø University Museum)

[32] *Northern Norway's Sea of Islands: Processes of Maritime Colonization and Settlement*

Epeli Hau'ofa's (1993) perception of Oceania as a "sea of islands" is a useful point of departure for exploring the long-term trajectories of the many thousands of islands scattered along the coast of northwestern Norway. Hau'ofa's vision of joined islands is also instructive as a way of emphasizing seaborne connectivity rather than insularity within maritime archaeology. This paper highlights problems related to island colonization and settlement since the Early Mesolithic (11,500–10,000 BP) in northern Norway with potential relevance for island archaeology at a global scale. A central problem is the necessity of documenting island landscape transformations as a prerequisite for understanding human-island interaction in a region where prehistoric shorelines may be currently submerged or elevated. A second problem related to island colonization is the pervasive underestimation of nautical expertise and sophistication of seagoing vessels prior to the Bronze Age in the archaeological literature. Evidence for island settlement among the indigenous coastal Sami is reviewed and the consequences of medieval Norse fishing settlement colonization of islands in Sami areas evaluated as a means of exploring the nature of colonization as a layered process.

Widmer, Randolph (University of Houston) and Rebecca Storey (University of Houston)

[80] *Teotihuacán at Night: Lighting a Prehispanic City*

Teotihuacán was a large and populous city at its height with an estimated population of 100,000 people. Since it lies in an arid landscape with neither domesticated animals as a source of dung for fuel nor oils from tree seeds these fuel sources could not have been used for cooking, lighting and to a lesser degree heating. Only wood from trees and shrubs and other plant materials could have been used for fuel. These have been identified in charcoal from archaeological deposits at Teotihuacán, indicating their possible use in lighting. Certain artifact types, such as candelaros, tapa platos, braziers, and censers, used for cooking and ritual also provide light. The demand for fuel from trees and shrubs would have been high, so these resources would have been managed and their distribution and consumption highly organized. We argue that Teotihuacán was a relatively dark and quiet city at night, and only those citizens and compounds that were wealthy enjoyed light from external fuel sources at night. We further suggest that Teotihuacáanos took advantage of light derived from ceremonies, rituals, and cooking and therefore performed these activities at night when light was required rather than in the day when light wasn't needed.

Wiebe, Matthea (Simon Fraser University), Peter Wallace (McMaster University) and Francesco Berna (Simon Fraser University)

[354] *Soil Micromorphology Analysis of Area D at Manot Cave, Israel: Insights into Site Formation Processes*

Manot Cave, discovered in 2008 in Western Galilee (Israel), represents one of the richest Upper Paleolithic assemblages in the Levant. The site has produced a ca. 55,000-year-old anatomically modern human calvarium, as well as Middle Paleolithic to Post-Aurignacian lithic and bone artifacts. The deepest stratigraphic sequence is found in Area D, located halfway down the steep talus. This area shows continuous stratification from dolomite

bedrock to an early sterile colluvium, an archaeological colluvium, and a late sterile colluvium. The aim of this work is to characterize the different stratigraphic units by soil micromorphology in order to determine their origin and correlate them to stratigraphy in the cave's other excavation areas. Components such as relative sizes of sand particles, microstructure, coprolite fragments, and chert gravel are utilized in our analysis. In particular we found that the early sterile colluvium is dominated by fine quartz sand, the archaeological colluvium by medium quartz sand, and the late sterile colluvium by very fine quartz sand. The very fine quartz sand dominating this late colluvium is also typical of the modern terra rossa soil. The implications of these finds for site formation and use of space will be discussed.

Wieckowski, Wieslaw C. (University of Warsaw)

[316] *Bioarchaeological Research at Castillo de Huarmey, Peru*

The Wari imperial mausoleum, discovered in 2012–2013 at the site of Castillo de Huarmey, Peru, brought to light remains of 64 individuals buried within the main chamber underneath and additional seven in the contexts directly associated with the mausoleum. The upper layers of the building also yielded a collection of human and animal remains. The collection of human remains brings a unique set of data for bioarchaeologists. The research performed so far include standard analyses like taphonomy, demography and health status, along with biogeochemical ones. Stable isotope analyses of strontium, oxygen, nitrogen and carbon provided insights into the geographical origins and potential mobility as well as dietary preferences of the individuals buried within that unique context. Preliminary DNA analysis widened the scope of information obtained. A lot more of analyses have to be performed to fully understand the character of the Wari presence on the north coast of Peru.

[316] *Chair*

Wiederick, Brock (Amec Foster Wheeler) and Fernando J. Astudillo (Simon Fraser University)

[220] *Industrial Islands: Ecological Impacts of the Steam-Powered Mills of the El Progreso Plantation, Galápagos Islands*

From 1880 to 1917 "El Progreso" plantation operated on the humid highlands of San Cristóbal Island in the Galápagos archipelago (Ecuador). The plantation enterprise used steam-powered machinery for sugar refining and alcohol distillation. Despite its remote location, 1,000 km west from the South American coast, this large operation took advantage of the latest industrial technology. A number of specialized machines were used in sugar processing which were imported from factories in Scotland and the United States. The implementation of the industrial machinery required large quantities of wood for fuel, permanent sources of water, and the construction of large buildings. After the murder of the plantation owner at the hands of his workers in 1904, the machinery and the mill operated for another decade before being abandoned. Parts of the machinery were removed to mainland Ecuador but some have remained on site. This paper explores the characteristics of the technology used during the industrialization of El Progreso plantation and its effects on the local ecology of San Cristóbal Island.

Wiegand, Jane

[90] *An Attempt at Digitally Associating Skeletal Elements: A Study of Photogrammetry and Articular Surface Area*

When excavating archaeological skeletal remains it is not uncommon to find them disarticulated and even commingled with other sets of remains. To study these remains it is paramount to first accurately and efficiently re-associate all skeletal elements. Re-association of skeletal remains is necessary before any other form of analysis (ancestry, sex, age, stature etc.) can be performed. While analog methods have been previously applied to standardize this task the advent of digital modeling provides a new medium within which new methodologies may exist. For example, photogrammetry is an accessible means of digitization with the potential to aid in shape analysis. This study used photogrammetry to answer two questions: is photogrammetry a practical means for digitizing skeletal remains? And, is articular surface area a measurement that can be used for re-associating skeletal elements? During the study photogrammetry was found to be a practical means with which 3D models could be rendered in part due to the basic and relatively affordable tools available, even in consideration of time and learning curve. In contrast, articular surface area would require further research to demonstrate its practicality, or lack thereof, for being a means by which disarticulated skeletal remains could be re-associated.

Wigati, Sri [180] see Ono, Rintaro

Wigen, Rebecca J. [46] see Stewart, Kathlyn

Wigodner, Alena (University of Arizona)

[234] *Being a Woman in Roman Gaul: Gendered Votive Offerings in a Colonial Context*

The annexation of Gaul into the Roman Empire in the mid-first century BCE spurred the development of new religious practices in that region, including the practice of offering votive figurines at sanctuaries. Because each votive represents a personal decision on the part of the dedicant, analysis of votive assemblages provides unique insight into the demographics of worshippers and illuminates aspects of individual identity in this colonial context. Here, I present the results of a quantitative analysis of gendered votives, most notably female anatomical figurines—a votive type that existed neither in Gaul nor in Rome at the time of Roman conquest. Analysis of the geographic spread of the practice of offering gendered votives as well as of the differences between male- and female- gendered votives, especially when compared with the much more Roman practice of offering written dedications, provides a means through which to study Roman colonialism as a gendered experience. These preliminary results suggest ways in which women in the Gallic provinces navigated the unique cultural landscape of Gaul under Roman rule.

Wilcox, David [335] see Howard, Jerry

Wilcox Black, Kelly (University of Chicago)

[167] *Zooarchaeology and the Study of Human-Animal Relationships in Pre and Early Historic South India*

The study of animal remains from archaeological sites has proven to be an invaluable approach to understanding past social, economic, and political practices. Despite the diverse behaviors and sets of relationships animal remains can index, faunal analysis has been an underutilized approach to studying Indian history and prehistory. In this paper, I present new research and zooarchaeological data to demonstrate how human-animal engagements changed throughout the Neolithic (3000–1200 BCE), Iron Age (1200–300 BCE), and Early Historic (300 BCE–500 CE) periods in South India. Using faunal remains from the site Kadabakele (Karnataka), I address how animal rearing, procurement, and consumption figured into the changing economic and agricultural regimes that ultimately laid the foundation for the emergence of urbanism in the region. In addition, I consider how a zooarchaeological study of human-animal relationships, in particular those forged through a history of animal husbandry, allow for us to critically engage with existing narratives concerning social and cultural change in South India.

Wilde, James (AF Civil Engineer Center)
[205] *Discussant*

Wilemon, Billy (Mississippi State University) and Michael Galaty (Professor and Dept. Head—Anthropology and Middle)
[287] *pXRF Analysis of the Pylos Linear B Tablets*

In 2015 and 2016 I analyzed all of the Mycenaean Linear B clay tablets and sealings from the Palace of Nestor at Pylos for their chemical composition using a portable X-ray fluorescence spectrometer. Sealings were used on containers of oil, wine, etc., and on baskets of tablets. Leaf-shaped tablets usually contain one entry or line of information. Page-shaped tablets contain several entries of related information. There are questions that these analyses may help answer:

- Did the sealings travel with material goods, or were they manufactured at the palace as materials arrived?
- When inscribed sealings are related to tablets, do they use the same or different clays?
- Do the tablet manufacturers use different clays, and were these manufacturers at the palace or located in remote areas?
- Can we gain insight as to whether the Archives Complex of the Palace was the functional economic center of the regional polity?

The answers to these questions will help us understand the controls placed on material wealth headed to the palace, how the tablet-writers interacted with goods brought to the palace, and how information entered the official record.

Wiley, Kevin (SUNY Buffalo)

[336] *Circles and Circuits: A Computational Social Science Approach to Neolithic Circular Enclosures*

Through the combination of Social Network Analysis (SNA), Agent-Based Modeling (ABM), and Geographic Information Systems (GIS), this paper will examine the relationship between physical and social networks in the Middle Neolithic of Central Europe. This Computational Social Science approach will provide insight into social aspects of the archaeological phenomenon of circular enclosures.

Wiley, Nancy, Andrew Garrison (Scientific Resource Surveys, Inc.) and Kassie Sugimoto (Scientific Resource Surveys, Inc.)
[300] *Markers of Time: Exploring Transitions in Artifacts and Burial Practices at Bolsa Chica, Orange County, California*

The transition of artifacts recovered from the Bolsa Chica Mesa indicate changes in site use through different temporal periods. Early (9000–7500 BP) Bivalve Tivela beads give way to Olivella spire/end modified, then to Olivella Grooved Rectangle (OGR) beads (5500–4500 BP). Transitions in bead type and manufacture can be linked to the changing coastline conditions, availability of resources, and the influx of new populations. Further, the burial practices found at the Bolsa Chica Mesa sites also vary by associated temporal period in addition to burial location. The burial types found on the Mesa illustrate a range of methods spanning from small bone assemblages to complete interments. Previous burial analyses have hypothesized that the Bolsa Chica Mesa was used as a ceremonial burial ground. This study attempts to assess whether the observed shift in burial practices is associated with changes in population demographics, cultural trends, or taphonomic processes by assessing the relationship between shell features; ceremonial artifacts such as clogged stones, charmstones, and beads; and the various burial practices found at Bolsa Chica.

Wiley, Taylor (Indiana University South Bend), Joshua J. Wells (Indiana University South Bend), Eric Kansa (Open Context), Patrick Finnegan (Indiana University South Bend) and R. Carl DeMuth (Indiana University Bloomington)

[195] *More than Just Another Number: Use of the Smithsonian Trinomial System and the Digital Index of North American Archaeology (DINAA) to Link Open Information about Archaeological Sites across the Web*

Archaeological sites in the United States are often associated with alphanumeric identifiers known as Smithsonian trinomial numbers (STNs). Developed in the mid-twentieth century, STNs consist of patterned alphanumeric sequences, potentially recognizable in spreadsheets, archival records, and research literature. The Digital Index of North American Archaeology (DINAA), a linked open data hub for archaeological site information, is attempting “named entity recognition” (a form of text mining) to identify STNs in archaeological literature. The grand challenge undertaken here will ultimately allow a DINAA user to browse, via map-based visualizations, cross-references between DINAA site file information and publications containing related STNs. This initiative includes human-guided cataloging of STNs from recent American Antiquity offerings, and software-enabled text mining of STNs from the entire run of American Antiquity through the JSTOR for Research program. Challenges include: variation in STN formatting, inclusion of STNs in various elements of research articles (abstract, body text, tables, figures, notes, etc.), and publication of competing identification strategies (e.g., state and museum systems). We will present results of this pilot study to inform future linked open data use of STNs in other archaeological literature, governmental records (e.g., Federal Register), museum collections, and archives.

Wilke, Detlef, Tuende Kaszab-Olschewski (independent researcher [archaeologist]) and Gerald Grimm (independent researcher [archaeologist])

[282] *Compositional Analysis of Roman and Late Medieval Terracotta Figurines Found in Worms (Antique Borbetomagus)*

Nondestructive XRF was used to provenance Roman and fifteenth-century molded figurines found in Worms, Rhineland-Palatinate (Germany). Three Roman kiln areas with waster material of various kinds of cooking and dining pottery were detected, but no coroplastics. Two kiln areas provided sherds with a highly uniform paste pattern identical to Roman amphora and roof tiles formerly analyzed by destructive WD-XRF, and supposed to be produced in Borbetomagus. A third kiln additionally contained utilitarian pottery fragments of a distinct pattern, which could be identified with pottery and clays from Urmitz-Weissenturm located some 130 km down the Rhine River, probably a domestic fill when the third workshop was shut down. Only one out of 14 Roman figurines exhibits the local paste pattern of the utilitarian pottery. It is an orange-fired single, whereas the other figurines were molded with a whitish paste similar in pattern with pottery from Speicher, near Trier (Augusta Treverorum), and from Koeln (Colonia Claudia Ara Agrippinensium). The late medieval molded figurines are production wasters of a workshop located in the center of Worms. The source of the special white-firing “pipe clay” is unknown, but compositionally similar to clayey kaolinitic sands in Tertiary lacustrine deposits in the nearby Palatinate Forest.

Wilkerson, Emily (Golder Associates Ltd.)

[42] *New Insights into Old (and New) Data: Lithic Technological Organization and Evolutionary Archaeology at the St. Mungo Site (DgRr-2), British Columbia, Canada*

Results from excavations at the St. Mungo site by Len Ham and his team in the early 1980s challenged previously held ideas about the Charles Culture (5000–3300 BP) in the Gulf of Georgia region. Previous research determined the Charles Culture was represented by egalitarian hunter-gatherer societies. Several lines of evidence were cited to support this idea, including both the absence of ground slate knives for intensive fish processing and storage technology which would have allowed people to overwinter in larger groups leading to socioeconomic complexity. Len Ham and team disagreed. Their work determined that stratified collector societies occupied the region during the Charles Culture, and they had data to support their theory. New data from several research projects over the past 10 years support Ham’s conclusions, including lithic data from recent excavations at St. Mungo. A technological analysis of the new lithic data from St. Mungo suggests people had developed and organized a sophisticated lithic tool kit for processing

large amounts of riverine resources, such as salmon, long before ground slate tools came into wide use in the region. Using an evolutionary archaeology framework, I assess how this tool kit was developed, modified and persisted into the Marpole Phase.

Wilkie, Nancy
[205] *Discussant*

Wilkins, Brendon (University of Leicester)

[70] *Crowdfunding, Crowdsourcing, and the Collaborative Economy: Old Wine/New Bottles, or Genuine Game Changer for Archaeology?*
DigVentures was launched in 2012 as a rewards-based crowdfunding platform designed to enable participation in archaeology and citizen science projects. We were formed by a small team of archaeologists, driven to action by what we saw as the three most pressing needs affecting our sector: the necessity for heritage professionals, museums and cultural organizations to reduce dependence on grants and state funding; the development of digitally enabled alternative finance models that diversify sources of funding; and the rise of the experience economy and popularity of citizen science. Our first campaign at Flag Fen stands as world's first-ever successfully crowdfunded archaeological excavation. Since then, we've repeated that initial success, crowdfunding a total of £150,000 for our projects, unlocking a further £700,000 in match funding from traditional grant-givers. Set within a broader economic trend that has seen the UK alternative finance market rise to £3.2b in 2015 (up 82% from £1.7b in 2014) and this new approach clearly offers promise. Drawing from specific examples from our project portfolio, in this short presentation I will explore the potential issues and practical steps that archaeologists can take to harness the crowd, and what differentiates this new model from anything that has gone before.

Wilkins, Jayne [40] see Schoville, Benjamin

Wilkinson, Darryl (University of Cambridge)

[265] *Refuge, Frontier, No Man's Land: The Changing Nature of the Andean Cloud Forests*

This paper will consider the Amaybamba Valley of southern Peru as an ecological and political frontier zone, from the late prehistoric era until the early colonial period. The Amaybamba region is a part of the cloud forest zone of the eastern Andean slopes, and is thus located where the highlands rapidly shift into the warm tropical lowlands of Amazonia. It is a region that has a complex and highly variable history, one reflecting its environmental characteristics, but often in unpredictable ways. Through a mixture of archaeological and documentary forms of evidence, the paper will discuss the occupation of the valley during the Late Intermediate Period (c. AD 1100–1400), on through to the Late Horizon (c. AD 1400–1532), followed by the post-conquest and Neo-Inca period (AD 1533–1572) and then finally the early colonial era (AD 1572–1650). As the paper will show, although there is always a strong relationship between the ecological and political frontier zones of the Amaybamba, the characteristics of this relationship were radically different across the centuries. No deterministic account of the region's ecological and political interactions can therefore provide an adequate explanation.

[265] *Chair*

Wilkinson, Patrick (University of California, Merced)

[175] *The Rock Art of Haitian Vodou*

This research is part of a larger ethno-archaeological investigation of the use of caves in modern Haitian Vodou rituals in Northern Haiti. This paper explores the modern rock art left in the caves as a result of Vodou ceremonies, in particular paint and veve (veve are symbols drawn out with cornstarch used to call various spirits to ceremonies, and are an intrinsic part of Vodou). The art in question included both permanent and ephemeral works, ranging from simple graffiti to caves painted with house paint in the colors associated with particular spirits.

Willerslev, Eske [330] see Damgaard, Peter de Barros

Willet, Patrick T. [371] see Vandam, Ralf

Willet, Alyssa [373] see Stone, Pamela

Willhite, Brenton (University of Missouri), Andrew Fernandez (University of Missouri), Andrew Krug (University of Missouri) and Christine VanPool (University of Missouri)

[155] *Paint It Black: A Geospatial Analysis of Chupadero Black-on-White Ceramics*

Chupadero Black-on-white ceramics were produced in the Salinas and Sierra Blanca regions of New Mexico beginning around AD 1100. They quickly gained popularity, covering a geographic region that encompassed much of the modern state of New Mexico, west Texas, southeastern Arizona, and northern Chihuahua. Yet, despite their popularity, little is known about the exchange mechanisms that yielded Chupadero Black-on-white's impressive distribution. ArcGIS contains analytical applications that can be used to explore mechanisms of geospatial variation. This project uses GIS to investigate the processes behind the distribution of Chupadero Black-on-white ceramics in the prehistoric Southwest. We find that the processes change over time as exchange networks expanded during the fourteenth century.

Willhite, Brenton [237] see Krug, Andrew

Williams, Gareth (British Museum)

[15] *The Size and Character of Viking Armies in the Light of Viking Camps from England and Ireland*

In the ninth century, Viking "armies" are recorded raiding (and in some cases conquering) in Britain, Ireland, and the Frankish kingdoms. Contemporary sources indicate that the largest of these were comprised of hundreds of ships and, by inference, thousands of men. Many of these accounts give round numbers, and historical opinion is divided between those who accept that the figures may represent approximations rather than absolute historical fact, but are nevertheless representative of very substantial forces, and those who argue that the figures are exaggerated for effect, raising further questions of what constituted an 'army' in this period. Archaeologically, the movements of these armies have left relatively little trace. A number of hoards and single finds can be linked with historically documented movements of specific forces, but until recently a single partially excavated winter-camp at Repton in Derbyshire has provided a paradigm for the likely size and form of such sites generally, and has been taken to support the minimalist

interpretation of Viking armies. The investigation in recent years of additional sites in England and Ireland points to the presence of much larger forces, while also pointing to diversity of activity which goes beyond traditional military definitions of Viking "armies."

Williams, Justin (Cultural Resource Analysts Inc.)

[89] *Clovis Style Hafted Bifaces: A Pan-Regional Perspective*

Many studies have made statements about the origin and method of the spread of the Clovis style hafted biface technology, but little research of late has evaluated Clovis from a Lithic Technological Organization perspective. This study examines a sample of 695 Clovis style hafted bifaces from across North America. I analyze trends in raw material use, flute length, reuse and resharpening in Clovis style hafted bifaces from across the country. I conclude that there is much variation in the types of raw materials used and the length of the flutes on Clovis style hafted bifaces. Additionally, this analysis reveals that Clovis style hafted bifaces are resharpened and retouched in an atypical manner. Finally, I use the results of this study to situate future questions that Pan-Regional studies of Clovis style hafted bifaces should pursue.

Williams, Katharine

[9] *Plumbate and Imitations*

Plumbate is a lustrous hard-paste ware characterized by small effigy vessels, some of which bear Central Mexican ideological influences. It was widely traded during the Terminal Classic/Early Postclassic across ethnic, political, and linguistic boundaries. Its widespread distribution and luster mark plumbate as unique among contemporaneous wares. It is sometimes found alongside locally produced wares that bear superficial resemblances, leading to the belief that they are imitations of plumbate. This research focuses on differences between imitation and plumbate wares with the goal of refining established criteria for distinguishing them. A secondary goal of this research is determining the production process of plumbate and both its luster and that of the imitations. In order to do this, compositional data (obtained via electron microprobe analysis) and recovery contexts of imitations and plumbate are compared.

Williams, Ken (Cahokia Mounds Museum Society) and John Kelly (Washington University)

[283] *Ground Truthing Cahokia's Feature X Anomaly*

A huge resistivity anomaly discovered several hundred meters northeast of Monks Mound was subjected to coring and test excavations in 2012. This testing revealed a series of major prehistoric landscape uses/modifications through time, some quite unexpected. The prehistoric sequence of events at this location, though still in need of further clarification, appear to infer significant shifts in communal priorities through time.

Williams, Mark (University of New Mexico)

[49] *Shellfish Harvesting Strategies on the Northern Northwest Coast: Evidence from Labouchere Bay, Southeast Alaska*

This poster presents new data from five shell midden sites on Prince of Wales Island, Alaska, in order to examine how shellfish-harvesting strategies changed during the middle to late Holocene. The accessibility and resilience of shellfish beds on the coastal margin makes them valuable resources that complement more seasonally-restricted food sources such as salmon runs. In order to meet the increasing needs of permanent settlements that emerged during the middle Holocene, shellfish management strategies would have had to adapt. Establishing specialized foraging camps and purposefully transforming sections of the intertidal zone into clam gardens would have improved the yield of shellfish beds owned by particular households. This research examines changes in the diversity and relative abundance of shellfish species within the middens at Labouchere Bay. Patterns of change are considered within frameworks of paleoecology, the priorities of individual foraging agents, and community-level settlement patterns and social organization. Analysis of stable oxygen isotopes reveals changes in environmental conditions at both a short-term seasonal scale and long-term climactic scale. Comparison with other sites in the region places these changes within the context of increasing sedentism and social organization.

Williams, Nancy (University of Tulsa), Nancy Williams (University of Tulsa), Thomas Foster (University of Tulsa) and Briggs Buchanan (University of Tulsa)

[197] *Social Change among the Lower Creek, the Late-Woodland to Historic Period*

The protohistoric and historic periods were times of great social change among Native Americans of the southeastern United States. The era saw mass migration and shifts in political association. The indigenous tribes of the Chattahoochee River, later known as the Creek, were no exception to the cultural changes of the time. The current historical and archaeological interpretation of these changes suggests that the Creek became more closely aligned, culturally, through time. These interpretations are based on historic documents, proximity and ceramic seriation and sequencing. This paper used social network analysis to test the current interpretations and determine if the relatedness of Creek and Creek ancestor sites, in middle and lower Georgia, Alabama and north Florida, changed over time.

Williams, Patrick Ryan (Chicago Field Museum) and Donna Nash (UNCG)

[29] *Radar, Lidar, Drones, and Donkeys: The Evolution of Archaeological Mapping Technologies in the South Central Andes*

In this paper, we review our use of digital technologies to model archaeological landscapes over the past two decades in Peru and Bolivia. We focus on three scales of analysis in four thematic areas that leverage state of the art technology and GIS modeling as a means for understanding the archaeological record. Our scales run from the built environment of local sites and monuments to regional agricultural landscapes to subcontinental interaction spheres. We look thematically at modeling urban space in ancient cities to creating anthropogenic hydraulic networks in agrarian systems. At the broadest scale, we examine the relationship between regions through the analysis of ritual landscapes and the networks of roads that link places together and how digital technologies have allowed us to integrate these scales of analysis in our work on the Wari and Tiwanaku states of the Andes.

Williams, Patrick Ryan [62] see Penfil, Rachael

Williams-Beck, Lorraine (Universidad Autonoma de Campeche)

[204] *Classic Maya Architectural Form, Function, and Urban Context in the Chenes Region, Campeche*

This paper revisits Classic Maya free-standing towers and portal vaults, some of which were first reported as isolated structures in the Chenes Region during the late nineteenth century. Recent research highlights not only formal attributes, but also their particular architectural compound and urban contexts not mentioned by previous studies. More complete architectural compound and urban layout data suggest new temporal and functional interpretations for these unique masonry features at Tabasqueño, Chanchen, Nohchen, and Nocuchich. These data also shed new light on particular north-south axis site location, previously ascribed an archaeoastronomical association in the literature, and possible tower/portal vault meaning in restricted access architectural compounds at these places within the immediate region.

Williamson, Kylie (University of Florida), Julia Giblin (Quinnipiac University), Jaime Ullinger (Quinnipiac University) and László Paja (University of Szeged)

[196] *Spatial Analysis and Sampling Techniques of Cremated Remains from Bronze Age Cremation Urns in Southeast Hungary*
 Since 2011, members of the Bronze Age Körös Off-Tell Archaeology (BAKOTA) Project have excavated 57 cremation urns from the Békés 103 site in Southeast Hungary. This exploratory study seeks to examine the percentages of cranial and postcranial elements present in microstratigraphic levels in order to better understand the spatial distribution of bones within the burial urns. As a way to explore new approaches, two sampling methods were employed for the analysis of three burials. The first involved a random 20% sample of each microstratigraphic level, and the second involved the entire contents of each level. Across each level, fragments were classified as cranial, postcranial, or indeterminate, and total weights of the cranial and postcranial elements were recorded. These two methods were applied to test if the 20% sample adequately represented an entire cremation urn. Preliminary results suggest that the smaller sample has a similar distribution of cranial and postcranial elements within the urn. This is promising, as it allows for data to be collected more efficiently across numerous cremations. By deciphering the spatial distribution of the cremated remains, this study aims to better understand the mortuary practices utilized at the Békés 103 site.

Williamson, Ronald F. [30] see Pfeiffer, Susan

Willis, William (University of Nevada Las Vegas)

[155] *Spatial-Temporal Distribution of Prehistoric Puebloan Settlements and Ceramic Wares on the Shivwits Plateau*
 During the summer of 2016, graduate students from the University of Nevada, Las Vegas conducted in-field ceramic analysis on Virgin Branch Puebloan sites found on the National Park Service portion of the Grand Parashant National Monument. Data collected from this project were analyzed in GIS in order to establish habitation site chronology in the region as well as address spatial artifact and settlement patterns through time as they relate to environmental variables. It is concluded that the land in the southern portion of the project area was favored more by the Virgin Branch during the early part of the region's occupation. However, relating changes in settlement distribution patterns and land use through time to environmental variables is not straightforward. Finally, the findings of this study lend support to the hypothesis that Shivwits Ware ceramics were produced in the far southern portion of the Shivwits Plateau.

Willison, Megan (University of Connecticut)

[252] *Two-Spirits or Changing Gender Roles? An Investigation of Mortuary Remains in Southern New England*
 Funerary objects from three seventeenth-century burial grounds were statistically associated with biological sex categories to discern what, if any, burial items were related to the sex of an individual. A handful of material objects proved to be almost exclusively associated with either sex; what also appeared from this analysis was the discovery of two burial assemblages that possessed a mixture of what are believed to be solely male or female burial goods. Utilizing archaeological and linguistic data, this paper suggests that one explanation for these two burial contexts is the occurrence of non-binary gender systems in seventeenth century southern New England. If not representative of two-spirits, this paper argues that these burial assemblages may instead reflect changes in gender roles resultant from European cultural contact and acculturation. This research has implications for broadening the scope of known non-binary gender structures in North America and discerning further evidence of indigenous cultural change and perseverance in the seventeenth century.

Willoughby, Pamela (University of Alberta)

[146] *A Middle and Later Stone Age Sequence from Iringa, Southern Tanzania*
 Magubike rockshelter in the southern Highlands of Tanzania contains a long archaeological sequence ranging from the Middle Stone Age (MSA) through historic times. This paper describes the lithic sequence from test pit 5, which contains a 2.5 m thick cultural deposit composed of recent/historic remains, an Iron Age, a microlithic Later Stone Age (LSA), a macrolithic LSA, a transitional sequence from the MSA to the LSA and 90 cm of MSA artifacts. The later part of the sequence replicates the cultural deposits at the nearby shelter of Mlambalasi, where the microlithic LSA dates to the early Holocene and the macrolithic LSA to the late Pleistocene. The entire sequence gives a baseline for technological change at Magubike and for other sites in the Iringa region.

[146] Chair

Willoya-Williams, Raven [394] see Guilfoyle, David

Wills, Chip (University of New Mexico)

[130] *A Three Dimensional Reconstruction of the Pueblo Bonito Mounds*
 There are two large mounds on the south side of Pueblo Bonito that were extensively trenched in the late nineteenth and early twentieth centuries. Data from the re-excavation of three trenches are combined with new geospatial and remote sensing information to create a three dimensional reconstruction of mound history. Although low walls were built around parts of each mound at some point, there is no evidence that the mounds were ever enclosed by architecture. The mounds consist mostly of household debris and discarded construction material that was placed over buried artificial and natural channels that directed surface flows past Pueblo Bonito until late AD 1000s. Our reconstruction emphasizes the relationship between built environment and stream dynamics during the Bonito Phase (ca. AD 850 to 1200).

[130] Chair

Wills, Wirt [130] see Hamilton, Marian

Wilmeroth, Joana [210] see Lenssen-Erz, Tilman

Wilson, Dylan [7] see Wisner, Gavin

Wilson, Gregory (UC-Santa Barbara) and Timothy R. Pauketat (University of Illinois, Urbana)

[20] *The Organizational Implications of Architecture at Moundville and Cahokia*

What practices generated the largest and most complex Mississippian centers? We examine this issue through an analysis of Mississippian public and ritual architecture from Moundville in west-central Alabama and Cahokia in southwestern Illinois. Politico-religious buildings and associated practices or powers constituted the historical development of both places. Cahokians created a wider variety and more complicated distribution of such buildings than did Moundvillians. We argue that the Cahokian architectural order provides evidence of supra-kin movements that help to explain that region's complex ritual-residential precincts, nodal site networks, and farming districts. These relationships operated as part of a more centrally administered and regionally articulated mode of sociopolitical organization than existed at early Moundville.

Wilson, Katherine

[365] *The Ceramic Assemblage from Washington Mounds: A Caddo Site in Southwestern Arkansas*

The Washington Mounds site is an Early to Middle Caddo period (AD 800–1300) mound site with 11 mounds, some of which contain burials; two village areas are associated with the site surrounding the mounds. It is located in southwest Arkansas between the Red River and Little Missouri River Basins. Some level of ritual activity occurred at the site, but the types or scale was previously unknown. Two excavations have been done at the site: first in the early twentieth century by M. R. Harrington, and a second in 1981 by the Arkansas Archaeological Society and the Arkansas Archaeological Survey. Whole pots and potsherds from both documented excavations are considered in the analysis as well as pipe fragments (Red River long-stem varieties) to determine periods of use as well as ritual themes prevalent at the site. This study is an analysis of the ceramic assemblage through the theoretical perspective of ceramic ecology. As this is the first thorough analysis done at this site, the goals of the research include establishing information on life, status, and ritual activities of the people who occupied this site.

Wilson, Michael (Department of Earth & Envir Sci [Emeritus], Douglas College)

[307] *Geoarchaeology and Chronostratigraphy of the Sheep Rock Spring Site, Late Pleistocene to Holocene, Missouri River Headwaters Region, Southwest Montana*

The Sheep Rock Spring site (24JF292) lies in a small SW Montana valley between Sheep Rock and a residual tor. A late Quaternary sequence (>5 m) supports a chronostratigraphic model from dates on charred material in the upper two units: 1) basal rock landslide diamicton; 2) down-valley debris flows; 3) final Pleistocene-early Holocene (FP-EH, >10,200–8700 RCYBP) channel/floodplain alluvium and paleosols; and 4) mid-Holocene (MH, ca. 6000–5430 RCYBP) alluvial/colluvial fan with paleosols. Radiocarbon (N = 26) and stable isotope measurements underpin the age-model, with local events superimposed on regional early Holocene warming and drying. Samples include charred material (n = 11), organic sediments (n = 5), bone "collagen" (n = 7), and wood (n = 3). Residual bone organics from extinct megafauna among the landslide boulders gave a pre-Last Glacial date of ~20,700 RCYBP, doubtful given a $^{13}C/^{12}C$ ratio of -33.1‰ . Dated contexts provide evidence for introduction of relatively small corner and/or side-notched projectile point types from terminal Paleoindian times onward. Artifacts suggest intermittent, short-term camping and tool production. Artifact redeposition also raises concern for some dating samples. Organic sediment dates agree with the age-model (9060–8200 RCYBP for FP-EH, 5510–4720 RCYBP for MH), while wood and some measurements on acid-insoluble bone fractions do not; water-table fluctuations may be responsible.

[307] *Chair*

Windes, Thomas [130] see Mills, Barbara

Wineinger, Robin (New Mexico State University)

[92] *Sex-Related Differences in Dental Caries Prevalence in the Prehistoric American Southwest*

This research comprises a comprehensive study of oral health from three prehistoric Southwest sites in order to identify sexual differences in the prevalence of dental disease after the onset of agriculture. Dental pathologies, such as dental caries and antemortem tooth loss (AMTL), directly relate to an individual's diet, therefore indicate disparities in subsistence and dietary patterns. Previous studies have found that females exhibit higher rates of caries compared to males. These differences are considered to be the result of physiological, behavioral, or social variances between or within communities. My research reveals further insight into regional and temporal perspectives among pueblo skeletal samples. Specimens from the Southwestern sites of Pottery Mound (LA416), NAN Ranch (LA2465) and Kuaua Pueblo (LA187) were used for this research. I examined 57 male and 56 female dentitions to uncover possible sex-related disparities in dental caries. Males and females from Pottery Mound and Kuaua exhibited similar rates of dental caries and AMTL, suggesting no distinct variation in dietary patterns or behaviors between the sexes. NAN Ranch held the most statistically significant differences between males and females, indicating that the factors associated with the development of dental pathologies are complex and ultimately depend on site-specific dynamics.

[92] *Chair*

Winemiller, Terrance [281] see McKillop, Heather

Wingert, Sara (Kutztown University) and Khori Newlander (Kutztown University)

[260] *Missing the Point: Identifying Perishable Projectiles in the Archaeological Record*

For decades, archaeologists have used replicative studies to develop a better understanding of prehistoric technology. Many replicative studies have focused on the manufacture and use of stone projectiles, resulting in a detailed understanding of the design of hunting weapons in relation to various features of the environment and, in turn, elegant explanations for technological change over time. Yet if ethnographic accounts are any indication, lithic technology was only one (perhaps minor) part of many prehistoric technological systems. It is likely, then, that the technological changes we document through our morphometric analysis of stone projectile points occurred against a backdrop of perishable technologies often not represented in the archaeological record. Here, we report on a replicative experiment designed to investigate whether we can "see" perishable projectiles in the archaeological record based on the damage they inflict on animal bones. Specifically, we examine if wood-tipped, fire-hardened, and stone-tipped arrows produce distinctive damage signatures. We use the results of our study to examine explanations offered to account for the transition from the dart to the bow and arrow in North America.

Wingfield, Laura

[310] *Collecting Costa Rican and Nicaraguan Art: On the Case of Enrique Vargas Alfaro, Dealer*

In the mid-twentieth century crates full of Costa Rican antiquities made their way into the United States through the diplomatic immunity of Enrique Vargas Alfaro. Paul Clifford, then a business man in Miami and later donor and curator at the Duke University Museum of Art, purchased works from Vargas in addition to procuring his own pieces from Peru. Clifford's friend Bill Thibadeau of Atlanta and a few of his neighbors enjoyed "block parties" to open the latest Vargas crate and then to divvy up the goodies inside. The Mayers of Dallas and later Denver also purchased pieces from Vargas. As the laws changed against such collecting efforts, some of these collectors also changed their ways, while others continued to procure new pieces and/or to defend these collecting practices. Through several decades of researching Nicaraguan and Costa Rican art (Nicaraguan pieces were often traded into

Costa Rica in ancient times and interred there, coming to light in the twentieth century through looting), I am slowly uncovering more and more details about the story of how these pieces came to the United States and how this case study fits into the greater dilemma of collecting antiquities in the twenty-first century.

Winstead, Seth, Katherine Miller Wolf (Indiana University East) and Hannah Plumer (Niagara County Community College)

[8] *Estimating Sex from Bones of the Hands and Feet: A Bioarchaeological Study of the Ancient Maya Site of Blue Creek, Belize*

For bioarchaeologists, biological sex estimation based off of skeletal indicators is a crucial element when creating a biological profile for human remains. While there are several ways for estimating sex, primarily involving examining cranial and pelvic morphology, one useful method that remains underutilized is metric analysis of bones from the hands and feet. Since males and females are sexually dimorphic, the ability to discriminate biological sex from hand and foot bones is possible and is shown to be valid. Skeletal metric data drawn from the hands and feet have successfully discriminated between male and female (bio)archaeological remains in Europe and throughout North America. Osteometric data for a Maya population from Nojol Nah in the Blue Creek region of Belize are presented to demonstrate the utility of such metrics in estimating sex. These data are useful to archaeologists or bioarchaeologists working with fragmentary or isolated remains in the field or lab.

Winterhalder, Bruce (Anthropology, UC Davis), Luis Pacheco-Cobos (Ecologia Conductual Humana, Universidad Veracruzana), Carmen Cortez (Graduate Group in Ecology, UC Davis), Estrella Chevez (Biología, Universidad Veracruzana) and Chloe Atwater (Anthropology, UC Davis)

[162] *The Effects in a Maya Community of School Enrollment on Young Adult Time Allocation to Activities Dependent on Traditional Ecological Knowledge*

School enrollment in traditional communities potentially compromises young peoples' participation in agro-ecological subsistence activities that encourage the development and practice of traditional ecological knowledge (TEK). Drawing on data from a Maya community located in Toledo District, Belize, we compared the time allocated to agro-ecological activities for school going (SG) or non-school going (NSG) male and female youth between the ages of 13 and 18 years. We find that SG males spend relatively less time engaged in agro-ecological activities (compared to leisure, eating, personal hygiene, and visiting) than do NSG males. School enrollment, however, does not affect the time females devote to subsistence-related activities. Regular school attendance thus appears to have a greater effect on young men than women. As a remedy, we propose and briefly describe a field-developed, active learning curriculum for Mayan high school students focused on milpa agro-ecology and forest subsistence activities in which traditional and scientific experiences can be shared. While data on age-specific commitment to subsistence activities can help us to understand the effectiveness of the prehistoric milpa economy, we focus here on reducing contemporary conflicts between formal education and traditional ecological practices.

Winterhalder, Bruce [383] see Jazwa, Christopher

Wise, S. Andrew

[241] *Midden Muddle*

Archaeologists occasionally find inconstant artifact assemblages between sites that appear similar. These variations in artifact frequency and diversity can hinder efforts to establish a one-to-one correlation between artifacts and cultural behaviors. However, coastal shell middens can provide important information regarding past habitation and social organization. By using shell and artifact distribution data, this research examines how Woodland cultures utilized coastal sites between 1000 BC to AD 1000. A comparative analysis of multiple midden assemblages from the Georgia and South Carolina coast demonstrates that there is considerable divergence at the inter-assemblage level. Close attention was paid to significant artifact patterns in the hopes of confirming a standard midden typology. Priority was given to the presence of burials and features due to their strong association with human activity and social organization. While ultimately sites are variable and cannot be forced into sterile categories, archaeologists can look at all measured variables to identify unique and helpful patterns

Wisely, Justin (Far Western Anthropological Research Group, Inc.)

[274] *Starch Grain Analysis of Bedrock Mortars in California: Implications to Our Understanding of California Prehistory*

Starch grain analysis is a growing field in California archaeology, with the potential to significantly add to our understanding of prehistoric peoples. Using a nondestructive extraction method for field sampling bedrock mortars, I was able to extract microscopic plant residues from the mortar surface for analysis. The subsequent identifications were made using my ethnographically-informed comparative collection of modern native plants. The results of this research indicate that the function of bedrock mortars is significantly more varied than currently assumed, and that small seed processing played a much larger role in California subsistence than previously thought.

Wiseman, Grant [336] see Amundson, Leslie J.

Wismer, Meredith (University of Iowa)

[181] *Ungulate Bone Fat Exploitation at the Adoption of Horticulture in Western Iowa*

Fat in the form of bone marrow and/or grease is a valued resource among foragers, and is more frequently exploited during times of subsistence stress. Risk-reduction in the face of resource stress is one potential theory for why prehistoric people incorporated horticulture into existing hunting and gathering practices. During the Woodland period (2800–1350 BP), the tallgrass prairie region of western Iowa provided a rich environment where numerous prey species could be found, including bison and deer. This paper examines subsistence stress during the adoption of horticulture by focusing on evidence for the utilization of bone fat within highly ranked ungulate taxa present at a selection of Woodland period sites within western Iowa. This research provides one line of evidence from which to examine the underlying factors involved in the shift toward production economies which occurred in later prehistory.

Wisner, Gavin (Northern Arizona University), Katie Tappan (Northern Arizona University), Dylan Wilson (Northern Arizona University), Chrissina C. Burke (Northern Arizona University) and Norbert Stanchly (AS&G Archaeological Consulting)

[7] *Animal Use in Ancient Maya Terminal Deposits: Examining Faunal Remains from Sites in the Belize Valley to Identify Ritual Activities*

Zooarchaeological materials from terminal deposits in the Belize Valley have the potential to assist archaeologists with understanding if terminal deposits represent ritual activities. This poster presents the results of zooarchaeological investigations of terminal deposits at the sites of Lower Dover and Baking Pot. While archaeologists from the Belize Valley Archaeological Reconnaissance Project (BVAR) have focused on the pottery and lithic materials in these deposits a thorough comparative analysis of the faunal remains from both sites has not previously been completed. Our analysis focuses specifically on the skeletal elements and species present, evidence for worked bone or cutmarks, and taphonomic features that may assist with

deciphering influences on the deposits through time. Comparing these two sites will assist with understanding if the faunal materials from terminal deposits can provide information on the use of animals in ritual activities by the Maya and to further the understanding of the purpose for terminal deposits in the region.

Wisner, Gavin [321] see Burke, Chrissina C.

Wissing, Christoph [284] see Bocherens, Hervé

Witschey, Walter [224] see Bates, Brian

Witt, David (NYS Department of Environmental Conservation) and Kristy E. Primeau (NYS Department of Environmental Conservation)
[192] *Soundscapes in the Past: Interaudibility in the Chacoan Built Landscape*

Sound has been a long disregarded aspect of the cultural landscape, despite being an important factor in how we, as human beings, interact with the wider world. By incorporating a consideration of sound, archaeologists can more fully understand the embodied experience explored through phenomenological approaches. In this poster, we investigate the interaudibility present within the built landscape of Chaco Canyon, using a GIS tool we have developed over the past two years. Focusing on Downtown Chaco, we present a soundscape, illustrating how events at shrines, stone circles, isolated kivas, and great houses may have been heard at other locations.

Witt, Kelsey (University of Illinois at Urbana-Champaign), Julie M. Allen (Illinois Natural History Survey, UIUC), Steven R. Kuehn (2. Illinois State Archaeological Survey, Prairie R), Mary L. Simon (2. Illinois State Archaeological Survey, Prairie R) and Ripan Malhi (Department of Anthropology, University of Illinois)

[181] *Dietary DNA Analysis of Mississippian Dog Coprolites*

Traditional methods for assessing diet of animal coprolite samples include targeted PCR and sequencing of specific genes. While useful for species identification, focusing on a single gene region disregards the plant and animal DNA fragments that are from other parts of the genome. Here we used next-generation sequencing methods to sequence DNA from coprolite samples from Terminal Late Woodland and Mississippian dogs from the Janey B. Goode site in Southern Illinois. BLAST searches were used to compare the sequenced reads to complete mitochondrial and chloroplast genomes of plants and animals. Analysis of the coprolites demonstrates that the dogs at Janey B. Goode ate an animal diet of fish, which correlates with previous zooarchaeological analyses of coprolite contents, and a more varied plant diet that included sunflowers, and, in some of the dogs, maize. The presence of maize in the diet of the dogs is significant because maize was an important part of Mississippian culture, and determining the age of the coprolites can help assess when maize arrived to southern Illinois, the timing of which has not yet been clarified. This research demonstrates that next-generation sequencing of coprolites can yield more diverse dietary information than targeted PCR methods.

Wobst, H. Martin (University of Massachusetts)

[65] *Discussant*

Woehlke, Stefan [2] see Sonderman, Robert

Wohlgemuth, Eric and Maria C. Bruno (Dickinson College)

[388] *Intensive Use of Wild Chenopodium by Central California Hunter-Gatherers*

Three decades of California paleoethnobotany have shown that *Chenopodium* is the most common small seed found in central California archaeological sites. *Chenopodium* is concentrated in sedentary residential communities in lowland areas, where historical population densities rivaled or exceeded those found elsewhere in the world. The most intensive use known for *Chenopodium* is from wetland areas of the Sacramento and Santa Clara valleys. Despite thousands of years as the preeminent small-seeded plant food and good reason to suspect active wild plant management, initial recent studies reveal no evidence of *Chenopodium* domestication in California.

Woldekiros, Helina (Washington University in Saint Louis)

[171] *Early Farming Communities in East Africa and the Horn: New Zooarchaeological Evidence from Mezber, Northern Ethiopia*

Animal herding formed a central component of Pre-Aksumite (>800–450 BCE) and Aksumite (450 BCE–800 CE) subsistence economies in the North Ethiopian and Eritrean highlands. Despite this, detailed understanding of animal utilization and diversity of species is lacking for this period. New data on species abundance and radiocarbon date from the site of Mezber in the North Ethiopian highland throws a new light on the earliest mixed farming communities in the Horn of Africa over the last 3,000 years. This rural settlement site provides faunal evidence for herd management strategies. Cattle, sheep, and goats are integrated with chickens originating from the Red Sea area. Cattle make up a high proportion of the assemblage through time. This relative high abundance of cattle indicates an environment that was stable and supported stock keeping for at least 1,000 years. The presence of a small percentage of wild animals in the Mezber assemblage shows animal husbandry that was complemented by hunting systems.

Wolf, Marc (GC CUNY)

[346] *GIS, Identity, and the Sacred Landscape*

GIS techniques are no foreigner to Mesoamerican studies though the hybridization of digital analytics and human identity is incomplete. In recent years suites of technologies have allowed for better visualization of data within archaeological projects. Though computer programs and higher profile data-gathering techniques have become widely embraced by the archaeological community, research should be rooted in cultural proclivities as well. By recording the complex shifts in topography via remote sensing, drafting architecture based on satellite derived data, and using excavation data to corroborate architectural data within the paradigms of computer driven analytical techniques, new patterns and questions emerge. This paper will focus on recent GNSS mapping of the archaeological site of Cancuen in the Transversal region of the interface between highlands and lowlands. The site offers a unique application and integration of GIS techniques while acknowledging the importance of the human element behind the constructed landscape.

Wolf, Sara (DOI-NPS-NMSC)

[2] *Emergency Response PTSD, Climate Change Denial, and Resiliency: The New World Disorder*

Curators and conservators have been wading through water for decades to rescue museum collections after natural and man-made disasters. The urge to “fix” things that have broken seems to be rooted in our DNA. Since 2003, I have had the opportunity not only to be a part of the emergency response community, but to witness the impact of these events on responders and collections. At the same time, there has been the development of an entire museum emergency response profession, a dramatic uptick in the commercial response field, and a piling-on of emergency response training. The disaster response culture also has spawned full academic programs, nearly endless analyses of motive, culture class, and emergency psychology that aim to improve our response future. Actual responses, however, appear to polarize around avoidance changes; tied to fears about climate change, or defensive actions founded on denial. In both cases, tending to be focused on “fixing,” we have incorporated the idea of building resiliency into the architecture without considering threats from the wider external environment. This presentation seeks to resolve the natural tendencies of people to express either, “it won’t happen here (again),” versus the Chicken Little Syndrome.

Wolff, Christopher (University at Albany)**[144]** *Subarctic Coastal Pioneers: Evidence and Implications of a New Maritime Archaic Site in Eastern Newfoundland*

The earliest colonization of the island of Newfoundland was by a coastal and marine oriented people belonging to the Maritime Archaic tradition (ca. 8000–3200 BP). The exact timing and nature of that colonization and subsequent “settling in” process remains largely unknown. Part of the reason for this is the dearth of well-dated, systematically excavated habitation sites on the island during the Archaic period. In the summer of 2016, our excavations at the Stock Cove site on the coast of southeastern Newfoundland recovered a significant artifact assemblage that suggests an extensive Maritime Archaic occupation. This provides some of the first evidence for the settlement of that region from a secure stratigraphic context. In this paper we will present initial analyses of these recent finds and briefly discuss their broader significance to our understanding of the role that coastal adaptations played in the colonization and settlement of northern post-glacial regions in the North American Eastern Subarctic.

[144] *Chair***Wolfhagen, Jesse (Stony Brook University)****[73]** *More Than a Source of Data: The Benefits of Active Collaboration between Macrofaunal and Specialist Analyses at Neolithic Çatalhöyük*

The faunal remains excavated by the Çatalhöyük Research Project are notoriously voluminous, making them the focus of many specialist analyses over the course of the recent project. Stable isotopic data from zooarchaeological remains have long been used to inform paleoecology and past human dietary patterns. Zooarchaeological isotopic data have increasingly been used to revolutionize our understanding of past herding strategies, particularly in early herding contexts like Neolithic Çatalhöyük. The resulting large datasets from zooarchaeological and isotopic studies at Çatalhöyük have provided crucial data for understanding characterizing past diets, herding systems, and ecologies. However, these datasets have been largely fragmented from one another by the initial structure of the Çatalhöyük Research Project and its faunal database, as well as the logistics of coordinating in-field and off-field research agendas. This paper discusses the potential for more concerted integration between stable isotopic and zooarchaeological data by demonstrating how consideration of an animal’s age and sex can help restructure stable isotopic comparisons of animal diet to reflect past herding systems. The opportunities afforded by this integration are broadly applicable and help reframe the isotopic analysis of zooarchaeological data from a source of background, ecological data toward an avenue for investigating past social dynamics.

Wolfhagen, Jesse [181] see Otárola-Castillo, Erik R.

Wolin, Daniela (Yale University), Yuling He (Institute of Archaeology, Chinese Academy of Social Sciences), Zhonghe Liang (Institute of Archaeology, Chinese Academy of Social Sciences) and Junfeng Guo (Jinan Institute of Archaeology)**[113]** *An Intersite Comparison of Human Skeletal Trauma in Shang Dynasty China*

Participation in the near-constant military campaigns of the Late Shang dynasty of China may have constituted an important social role for much of the population. Archaeologists have employed mortuary analysis and a close-reading of contemporaneous oracle bone inscriptions to help elucidate the nature of warfare and its participants. A large-scale bioarchaeological analysis of human skeletal remains could not only provide valuable insight on the relationship between weaponry as grave goods and possible participation in violent interactions, but also illuminate the overall experience of traumatic events at the population level. This paper presents the bioarchaeological analysis of trends in traumatic lesions among a population from the Liujiazhuang locale of YinXu in Henan Province. Patterns in the distribution of lesions on the body are examined to assess whether they are more likely to result from accidental injury or intentional violence, along with a demographic analysis of who in the population is affected by diverse types of trauma. These results are then compared to two sites with Late Shang components in Shandong Province, Jinan Liujiazhuang and Qianzhangda, to assess how differences in the distribution of trauma may reflect differential participation in warfare-related events or variations in lifestyle and activity.

Wolverton, Steve [96] see Scott, Ashley

Womack, Andrew (Yale University)**[213]** *Use Wear and Standardization Analysis of Pottery from Dibaping, a Banshan Period Cemetery in Southern Gansu Province, China*

Excavated in 1978, the cemetery at the site of Dibaping in southern Gansu Province, China revealed hundreds of Banshan period (2600–2300 BC) ceramic vessels. The elaborately painted geometric motifs on many of the vessels led to them quickly being touted as an example of the pinnacle of artistic achievement in Neolithic northwestern China. Aside from typology, however, no other analyses have been done on these objects. The result is that little is known about how these vessels were created, the role that they played in mortuary practices, or even if they were used before being interred. This paper will present the results of recent use wear and standardization analysis of these vessels and the effect these have on our understanding of their production, use, and deposition. These results will then be framed within our wider understanding of the benefits and limitations of use wear and standardization analysis, and our current knowledge of Banshan period production and consumption practices.

[213] *Chair***Wong, Megan (Simon Fraser University), Martin Steskal (Austrian Archaeological Institute), Elise Naumann (University of Oslo), Johann Rasmus Brandt (University of Oslo) and Michael P. Richards (Simon Fraser University)****[151]** *Diet and Mobility in Roman and Byzantine Turkey*

Isotope analyses (C, N, Sr) have been conducted on human skeletal remains (n = 150) from the Roman and Byzantine periods (ca. 133 BC–ca. 1453) from the sites of Hierapolis and Ephesos (Turkey) to characterize and compare their diet and mobility. In addition we undertook a large-scale strontium isotope-mapping project in the region, modern plant and snail samples are also used to characterize the local bioavailable strontium values in southwestern Turkey. Hierapolis and Ephesos were both major centers of spiritual and commercial activities during the Roman and Byzantine periods,

and were important pilgrimage sites. This study has allowed us to be able to explore the diet and mobility patterns of residents of these sites, and also to look for isotope evidence of migrants and pilgrims. This large-scale study is ongoing and here we will present the initial results.

Woo, Katherine (University of Sydney)

[374] *Paleoeconomies in the East Alligator River Region, Australia*

The East Alligator River Region has undergone considerable environmental change throughout the Pleistocene and Holocene, with changing sea levels dramatically altering the ecosystems of this region. Current archaeological models for this region indicate that people adapted their economic activities to successfully exploit these shifting environments. Mollusks have played an important role in the economic activities of these groups and often comprise large portions of the regional assemblages, but they have not been subject to in-depth studies. Detailed analyses of midden material from rockshelter sites will develop a more comprehensive understanding of the changing economic role of mollusks, both in subsistence and as a raw material for tool use. Additionally, this project will use the known biological and ecological information available for these organisms as environmental proxies, in combination with existing data, to reconstruct the past environments at these sites and to examine and build on current models of long-term human behavior and use of coastal resources. These detailed analyses of the molluscan material provides new lines of evidence enabling reexamination of preexisting models for the region.

Wood, David [94] see Martz, Hans

Woodfill, Brent (Georgia State University)

[281] *Inland, Urban vs. Coastal, Rural Salt Production in the Southern Maya Lowlands: The View from Salinas de los Nueve Cerros*

Salinas de los Nueve Cerros is the only non-coastal salt source in the Maya lowlands. For over two millennia, Nueve Cerros' residents produced massive quantities of salt that was commercialized throughout the western Maya world. Unlike the Caribbean salt works, the salt here was contained within a large urban zone. The salt works used a variety of techniques to make the finished product, boiling brine and leaching salt-laden soils as in Paynes Creek but also scraping the salt flats. Each of these activities occurred in contexts that were tightly controlled by the ruling class—the workshops were adjacent to administrative structures containing wealthy tombs and both the salt dome and the brine stream were ringed by palaces, temples, and other elite structures that marked them as restricted, elite space. While the elite did control access to the salt source and the whole production process, the public had access to large quantities of the finished product, which they were able to use to produce a variety of secondary products—salted fish and meats, leather, etc.—without any evidence of elite involvement beyond the salt itself. By focusing their efforts on controlling salt, they inserted themselves into nearly every economic activity there.

Woodfill, Brent [218] see Rivas, Alexander

Woods, Heather [92] see Jansen, Amelia

Woodson, Kyle (Gila River Indian Community)

[335] *The Impact of Changes during the Hohokam Classic Period on Irrigation Agriculture and Irrigation Management in the Middle Gila River Valley, Arizona*

This paper examines the impact of changes during the Hohokam Classic period on the social organization of canal irrigation management along the middle Gila River in south-central Arizona. A series of important social, political, and environmental changes occurred during the Hohokam Sedentary to Classic period transition. This study examines this transition to see if it represents a hinge point in how irrigation was organized. The focus is on the irrigation organization which is the social institution that manages and assigns the roles to accomplish the tasks of managing an irrigation system. Another aspect of the study assesses how irrigation organizations are linked with the related political institutions as well as with each other. This helps to evaluate whether political leaders attained control over production or surplus from the canal systems in an effort to achieve higher sociopolitical status. The study is accomplished through an analysis of canal systems and settlement patterns at the village of Snaketown, as well as the neighboring Granite Knob, Santan, and Gila Butte canal systems and settlements. With this study, I return focus to Snaketown where Emil Haury originally defined the Hohokam cultural tradition, and reveal new insights into the prehispanic Southwest.

Woodson, Kyle [105] see Medchill, Brian

Woolard, Katherine (University of North Carolina Wilmington) and Briana Pobiner (Smithsonian Institution)

[85] *Cautionary Tales in the Use of Captive Carnivore Tooth Mark Data*

Evidence for hominin meat acquisition in the form of butchery marks on fossil animal bones dates back to at least 2.6 million years ago. With this new dietary behavior came competition between hominins and large carnivores for animal carcasses. Identifying which carnivores hominins were interacting with would allow various models of the timing and sequence of hominin and carnivore carcass to be evaluated. However, many studies of carnivore tooth marking and damage patterns are conducted with captive carnivores, without considering if captive samples are actually comparable to wild samples. We analyzed tooth pits created by captive and free-ranging lions in Kenya using a Dino-Lite microscope and found that while tooth pit sizes are similar, frequencies are different—larger groups of carnivores generally inflict more tooth pits. Therefore we advocate caution in using captive samples as models for the frequency of tooth pits inflicted by specific carnivore species. However, as the number of tooth pits may be indicative of the number of carnivores feeding on a prey animal, tooth pit frequencies may be useful for reconstructing whether social (e.g., lion, hyena) or solitary (e.g., leopard, sabertooth) carnivores were most likely responsible for tooth marks in some fossil assemblages.

Woollett, James (Université Laval—Centre d'études nordiques), Paul Adderley (Center for Environmental History and Policy, Unive), Céline Dupont-Hébert (Université Laval—Centre d'études nordiques), Guðrun Alda Gísladóttir (Fornleifastofnun Íslands, Iceland) and Uggi Ævarsson (Minjavörður Suðurlands, Iceland)

[190] *Ecohistories of Settlement of the Community of Svalbarð, Northeast Iceland*

The Archaeology of Settlement and Abandonment of Svalbarð research program has reconstructed chronologies of settlement movements on the Svalbarð estate (extreme northeast Iceland), from the ninth to the nineteenth century AD, as well as their environmental and socioeconomic contexts. Settlement expansions occurred in the tenth to thirteenth and the eighteenth to nineteenth centuries AD, interspersed with waves of widespread abandonment after ca. 1300 and 1800. Analyses of amended soils and of soil and air temperature and humidity data from sites across the estate allow assessment of the productive potential and growing season of particular farms during past climate regimes. Thereby, thresholds of viability for particular

farms can be projected. Climate-driven environmental changes figure in the first phase of abandonment, but to varying degrees in individual farm sites. Landscape archaeology and zooarchaeology studies suggest that ongoing changes in herding and subsistence economies and land holding institutions were also key motivators of settlement and abandonment trends. Farms differ greatly in productive potential while soil humidity was a key variable limiting their resiliency. The enclosure of favored sites early on argues for a centralized, redistributive, pattern of land management. Finally, the anthropogenic soil “memory” of successful prior settlement favored continued settlement thereafter.

Woolman, Jason [17] see Rowley, Susan

Woolwine, Lauren (University of Pittsburgh), Lucy Atha (University of Kent), Nicholas Shepetuk (University of California Berkley), Hannah Plumer (Niagara County Community College) and Katherine Miller Wolf (Indiana University East)

[8] *Keeping It in the Family? An Investigation into the Relatedness of Individuals Found in an Ancient Maya Chultún*

The ancient Maya site of Blue Creek, located in northern Belize, has revealed archaeological evidence suggesting regional occupation from the Preclassic through Terminal Classic periods. The excavation of one Late Classic group (550–830 CE), Kin Tan, by the Maya Research Project revealed a chultún containing the remains of five commingled individuals of various ages. Examination of these skeletal remains revealed some commonalities in postcranial nonmetric traits among those interred within the chultún. Data were collected on 17 cranial and postcranial nonmetric traits in order to determine whether the individuals within the Kin Tan chultún could be biologically related. Several common traits were observed (septal apertures, marginal tubercles, and suprameatal spines) in the sample, supporting the hypothesis that those individuals entombed within the Kin Tan chultún are potentially biologically related. This research helps to shed light on the mortuary rituals and funerary traditions of the occupants of Blue Creek.

Workinger, Andrew and Stacie King (Indiana University-Bloomington)

[137] *Obsidian Blade Production and Husbandry in the Nejapa/Tavela Region of Oaxaca, Mexico*

Studies of obsidian tool manufacture in Mesoamerica typically focus on workshops located at source areas or at the major sites controlling them. In this paper, we explore production at the periphery, from the Nejapa/Tavela region of Oaxaca located roughly midway between the sources in Central Mexico and those in the Highlands of Guatemala. Rather than the thousands of artifacts representing the byproducts and errors of a single workshop, we are forced to rely upon the handful that found their way into the general archaeological record, as both surface finds and from excavated contexts. The artifacts analyzed for this study include all 643 pieces of obsidian collected during the Nejapa/Tavela Archaeological Project. This relatively small number reflects the scarcity of the raw material, a problem which was largely overcome through careful husbandry. Local artisans learned to recover from manufacturing errors and also to craft thin and narrow blades to prolong the production life of imported cores. Scarcity is also evidenced by the small size of exhausted cores from the region, a possible indication of a handheld blade removal technique.

Worman, F. Scott (Missouri State University) and Anastasia Steffen (Valles Caldera National Preserve)

[87] *Watch Out for Landslides and Gopher Holes! Using Obsidian Hydration to Measure Postdepositional Site Disturbance in the VCNP*

Our study examines the potential for using obsidian hydration analyses to quantify postdepositional site disturbance. The Valles Caldera National Preserve (VCNP) in northern New Mexico encompasses a diverse and dynamic mountainous landscape that people have visited regularly for millennia to access large obsidian quarries and other resources. The result is a rich archaeological record with abundant obsidian artifacts. However that record has been altered, sometimes dramatically, by physical, biological, and cultural processes. We used standard excavation techniques along with detailed pedostratigraphic recording and clast size distribution analysis to begin investigating postdepositional processes at two large multicomponent sites in the VCNP. We then submitted hundreds of pieces of debitage for obsidian hydration analyses. The combined results provide one way to quantify the stratigraphic integrity of deposits at multiple locations at each site. In addition to illustrating the range of postdepositional alterations present, they demonstrate the effects of large-scale landscape factors such as slope and aspect. Moreover, we suggest that obsidian hydration analyses can contribute to effective resource management. Instead of emphasizing protection and/or further investigation of sites with apparently intact stratigraphy, it is possible to quantify the degree to which different locations may yield detailed information about the human past.

Worman, F. Scott [89] see Bruns, Laura

Worthey, Kayla (University of Arizona) and Joaquín Arroyo-Cabrales (Instituto Nacional de Antropología e Historia)

[140] *Gomphotheres, Mastodons, and Mammoths: The Fauna from El Fin del Mundo, Sonora*

El Fin del Mundo, Sonora is the only known site where Clovis artifacts have been found in association with the remains of gomphotheres (*Cuvieronius* sp.), dated to 11,550 ± 60 BP. Analysis of the faunal remains from the site confirms the presence of two juvenile/subadult gomphotheres (*Cuvieronius* sp.) found in close association with Clovis artifacts. A second bone bed located beneath the cultural layer, dated to ≤12,180 ± 40 BP, contains the remains of gomphothere, mastodon, mammoth, horse, and tapir. The co-occurrence of gomphothere, mastodon, and mammoth in the same bone bed is virtually unknown at any paleontological site other than El Fin del Mundo. Here, the implications of this association of “disharmonious” taxa are discussed in the context of terminal Pleistocene environmental change.

Worthington, Brian [340] see Colten, Roger

Wren, Colin D. [165] see Burke, Ariane

Wright, Aaron (Archaeology Southwest) and Colleen Strawhacker (University of Colorado)

[335] *Probing the Nexus between Hohokam Demography and Agricultural Productivity across the Preclassic/Classic Transition*

The onset of the Hohokam Classic Period witnessed the consolidation of settlements within the major river valleys of southern Arizona, a demographic reorganization that culminated after centuries of regional expansion, population growth, and cultural florescence. In the Salt River Valley, the resultant demographic packing was unprecedented and appears to have promoted environmental degradation, aggravated biological stress, and suppressed birth rates. It has been suggested that communities responded to this increased stress by intensifying their reliance on maize agriculture. We therefore use this paper to explore whether the productivity of farmland was a factor in the demographic processes associated with the Classic Period transition in the Salt River Valley. If so, we suspect populations would have massed in proximity to the most viable farmlands in the valley. To test this, we compare relevant data on soil quality around local platform mounds, the epicenters and hallmarks of Classic Period primary villages across the Hohokam World to those around ball courts, hallmarks of the Preclassic Hohokam World. Because platform mounds were products of considerable labor investment and

pillars of community identity, their locations signal places where communities deliberately and strategically chose to either maintain ties or establish new land claims during the Preclassic/Classic transition.

Wright, Alice [4] see Quinn, Colin

Wright, David (Seoul National University), Scott MacEachern (Bowdoin College) and Stanley Ambrose (University of Illinois at Urbana-Champaign)

[161] *Evolution of Iron Age to Modern Landscapes in the Benoué River Valley, Cameroon*

African landscapes have undergone radical ecological transformations since agriculture was introduced and spread across the continent. In some areas, it appears that grassland was encouraged at the expense of forests and woodlands, for agriculture and to provide fodder for livestock. To this point, most of the evidence for such practices has come secondarily from ocean or swamp cores, not directly from archaeological contexts. In this paper, we present a scenario for landscape evolution and ecological conditions during the Iron Age in the Middle Benoué River Valley in northern Cameroon, using data from archaeological sites and surrounding sedimentary and edaphic environments. We evaluate evidence that anthropic mounds were strategically located to simultaneously take advantage of riparian and upland environments. Stable isotope data indicates that portions of the region rapidly transformed from woodland to grassland during the Iron Age, but upland regions were less significantly altered, despite simultaneous archaeological site construction. The introduction of new crops and land management tools over the last 200 years has continued to transform the region's geomorphology and human ecology.

Wright, Joshua (University of Aberdeen)

[25] *Three Cities in the Heartland of the Khitan Liao Empire*

A wide range of Medieval settlement has been identified in the watershed of the Shar mörön river, a territory of grassland and narrow river valleys in the heartland of the nomadic Khitan and their Liao state (907–1125 CE). These settlements range from village landscapes to imperial capitals. This paper will introduce three urban settings of the Liao state: 1) A mercantile center, 2) a local administrative hub, and 3) an imperial capital city along with their immediate hinterlands. Through a synthesis of archaeological survey data, historical accounts and remote sensing we will characterize these cities, lay out some of the central questions in the study of these sites, and describe their forms and place in the larger inhabited landscapes of the Eurasian borderlands. Central questions include, to what extent were they immobile anchors in a landscape of mobile habitation? Elements of a system rigid enclosure for citizens of the empire? Monuments to the power of the Liao empire? Or one phase in a long term history of settlement in this culturally dynamic region?

[25] *Chair*

Wright, Lori (Texas A&M University, Department of Anthropology) and Ethan Grossman (Dept. of Geology and Geophysics, Texas A&M University)

[30] *Reconstructing Ancient Maya Nursing Behavior and Children's Diets at Tikal, Guatemala*

We examine the ancient Maya nursing practices and children's diets at the archaeological metropolis of Tikal, Guatemala, through stable isotopic analysis of permanent teeth in adult skeletons. Stable carbon isotope analysis of tooth enamel permits a measure of the relative amount of carbon from maize foods in the diet, and helps track the introduction of solid foods into the children's diet. Stable oxygen isotopes in tooth enamel reflect the sources of water that children consumed, and shed light on the duration of breastfeeding. By sampling canines, which form between birth and 4.5 years of age, and by measuring isotope ratios on microsamples of enamel from different stages of canine growth, these data bring into focus the nature of dietary change in the first few years of life. Third molars form in later childhood, between 9 and 12 years of age, giving a measure of older childhood diet in the same individuals. Here, we report on the analysis of mandibular canines from 80 Tikal skeletons, and third molars from 48 skeletons. These data provide a means to test hypotheses about differential access to nutritional resources among social groups at Tikal by examining childhood diets and nursing behavior more directly.

Wright, Rita (New York University)

[177] *From Rojdi to Harappa and Beyond: Regional Variation in the Indus Civilization*

Steve Weber's pioneering research on botanical remains and environment has provided foundational studies for subsistence and settlement in the Indus civilization. Results of his field research at Harappa in the Punjab, Rojdi in Gujarat, and Farmana in Haryana focused in three key areas where major Indus centers were established. Differences in archaeobotanical remains provided a firm basis from plant remains and long-term agricultural packages in the three regions. These ranged from multi-cropping strategies that included overlapping plant usage to differences in selection of dominant crops. Although Weber emphasized their environmental differences as selective factors, his emphasis on choice as a major determinant allowed for comparisons between the early remains of the Indus civilization and recent trends in the three regions.

[209] *Chair*

Wu, Mengyang [72] see Osing, Natasha

Wu, Mu-Chun (National Taiwan University)

[208] *Modeling Communities: Social Transformation of Early Kaushi, Taiwan*

This paper presents the modeling of different communities within two sites, Saqacengalj and Aumagan, which exemplifies the early developments of the Kaushi people. In the light of Ingold's "wayfaring theory" (Ingold, 2012), this research argues that interpersonal relationships are not entirely based on social identities, and social relations should also be investigated, regardless of their hierarchical status, but through intimate human interaction. Therefore, this research models human agency from a "meshworked" perspective, and demonstrates how social interactions and relations are influenced through agents walking around a settlement. This bottom-up approach allows the examination of the allocated social relations as opposed to the delegated social identity, and benefits from understanding how different communities interacted. This paper not only highlights the methodological approach of the model, but also presents the changes in settlement pattern as well as the social transformation of early Kaushi people.

[208] *Chair*

Wu, Xiaohong (Peking University)

[26] *Dating the Bronze Artifacts from the Archaeological Sites along the Hexi Corridor*

There are many bronze artifacts found from the sites located along the Hexi Corridor. The radiocarbon dates assigned to the archaeological sites do not always represent the time of the bronze artifacts from the sites. The bronze artifacts can't be dated directly. To get the precise dates of bronze artifacts

needs to understand the formation of archaeological sites and the archaeological context of the bronze artifacts with pottery and other datable remains. The good samples for radiocarbon dating are the short-life plant, bone remains and so on unearthed with clear archaeological context of bronze artifacts. Some sites were well excavated in recent years. These made it possible to get the precise dates for the archaeological sites and bronze artifacts. The ages of the bronze artifacts appeared at different locations along the Hexi Corridor will be discussed in this paper.

[26] Chair

Wunsch, Mark [77] see Greening, Spencer

Wurster, Bethany (Utah State University), Kate Hughes (Crow Canyon Archaeological Center) and Shanna Diederichs (Crow Canyon Archaeological Center)

[89] *Take a Knap Inside: Evidence for Lithic Activities and Behaviors in Various Pit Structure Types at a Basketmaker III Settlement in Southwest Colorado*

Basketmaker III (AD 500–725) was a period of technological and social change for Ancestral Pueblo peoples of the northern Southwest. Along with population expansion, territorial colonization, and the development of original social institutions, Basketmaker III populations invested in a new technological complex that included fired pottery and dry-land agriculture. Lithic reduction activities are an understudied component of this social and technological complex. Our research captures a range of behaviors associated with lithic reduction and utilization at an aggregated Basketmaker III settlement located in southwest Colorado. The Dillard Site (5MT10647), occupied in the sixth century AD, is comprised of 13 pit structures that include temporary and long-term residences and a rare early Ancestral Pueblo great kiva. By examining and comparing macro- and micro-debitage and tool assemblages found on structure floors, this research demonstrates that the site's occupants patterned their lithic reduction behavior in both public and private spaces. This resulted in specialized production areas, disposal and cleaning behaviors, and a symbolic association with lithic material.

Wyatt, Andrew (Middle Tennessee State University), Cameron S. Griffith (Texas Tech University) and Rebecca Friedel (University of Texas at San Antonio)

[321] *The Archaeobotany of Ritual: The Role of Palm (Arecaceae) in Ancient Maya Caves*

The past several decades of research have identified caves as important loci for precolumbian and historic Maya ritual activity. To the ancient Maya, caves served as portals to the underworld, functioning as sites where ritual practitioners could be in closer contact with important deities and enact rites associated with natural forces. The Belize River Valley has been a significant area for cave exploration and excavation, and Stela Cave in particular, located in the Cayo District in western Belize, has provided a rich source of data for understanding this ritual role of caves. The Maya utilized Stela Cave from the Late Preclassic period through the more recent historic period, and excavations yielded numerous archaeobotanical remains. Among this assemblage we have identified substantial amounts of palm wood (Arecaceae). In this presentation we discuss the archaeobotanical assemblage from Stela Cave, focusing on the role of palm and its importance in precolumbian Maya cave ritual.

[321] Chair

Wygall, Brian (Adelphi University)

[140] *Technological Complexities of the Peopling of Eastern Beringia*

Alaska archaeologists continue to disagree on a unified culture history. The primary point of contention surrounds the presence or absence of microblade technology in central Alaska and the meaning of the Nenana and Denali complexes. While some interpret the former as a unique manifestation representing a separate migratory population, others disagree; and, the Denali complex has become a catchall category for a variety of artifact types leading to questions over its conceptual validity. This assessment tests specific questions pertinent to the relationship between prehistoric tool use and ecotones in an attempt to explain the presence or absence of particular artifact types and land use strategies through time. It also reflects on issues caused by repeated occupations, palimpsest assemblages, and other taphonomic processes that influence archaeological consensus. Results indicate separate phases in the initial colonization of Alaska and form a testable hypothesis based on functional land use properties associated with the Denali complex era in a way that distinguishes it from other early technologies in the region. The approach contributes to a long-standing discussion over subjectivity among archaeological categories and explains assemblage variability in eastern Beringia with widespread implications for interpreting the initial peopling of the Americas.

Wygall, Brian [387] see Krasinski, Kathryn

Wylde, Michael (University of Florida)

[358] *The Inca Dogs and Their Ancestors*

The goal of this paper is to elucidate the social role of the dog in ancient Peru as an artifact, a physical manifestation of culture, produced by humans, through archaeological and iconographic interpretation. The large numbers of dogs available for study are a neglected archaeological resource, and one that can provide a wide variety of information on human life and cultures in ancient Peru. Through the examination of archaeological dog remains and dog iconography from differing temporal and geographic contexts, we can track changes in morphology and use to establish a database following these changes in archaeological contexts and functional differences as well. Through this research I will show that the dog in ancient Peru, through differing temporal and geographic contexts, sometimes inhabited a special place in society, conferring special status on their human owners.

Wyllie, Alison

[65] *Discussant*

Wyllie, Cherra

[391] *Mimesis and Alterity in Classic Veracruz Ceramic Art*

The relief-carved fine paste wares, figurines, and ceramic sculptures of south-central Veracruz exhibit stylistic similarities often attributed to mass production. Yet, there are few molds in the archaeological record, suggesting that replication hinges on the artist's understanding of materials, techniques and canons of representation. Looking beyond the southern Gulf lowlands we see certain affinities between Classic Veracruz ceramic art and that of its Mesoamerican neighbors. Barbara Stark notes that ceramic resemblances can be measured on an ordinal scale distinguishing degrees of copying. Using Stark's metrics of replication, imitation, and adaptation, this paper examines stylistic standardization and emulation both locally and interregionally.

Xi, Qifeng [58] see Chen, Shuxiang

Xia, Yang [30] see Fuller, Benjamin

Xiaohong, Ye and Tang Jigen

[117] *Investigation of Incising Techniques on Jades from the Fuhao Tomb in Yinxu*

During the Shang dynasty the remarkable tradition of working jades extends back to the Neolithic period. However, the duplicate or symmetrical design incised on jades is the major artistic style at that stage. The present study is based on examination of molds of tool marks on several jades unearthed from the Fuhao tomb in Yinxu by scanning electron microscopy. Our observations suggest that rotary incising wheels charged with abrasive (which is called Jieyu sand in ancient China) were used for incising the fine features and handheld tools were still being occasionally used in some details. In addition, no evidence was found for rotary sawing tools on the jades.

Xiaolin, Ren [33] see Storozum, Michael

Xie, Liye (University of Toronto)

[36] *People in Construction: Insights from Ethnographic, Historic, and Archaeological Accounts in China*

Labor recruitment and management are essential to accomplish massive public construction in ancient times, as in today. Archaeologists across the world have examined ethnographic accounts and conducted experiments to understand labor costs and organizational structure for construction and maintenance of large architectural projects. Common conclusions are that the workforce in monument construction during the pre-Iron age could have been easily recruited by non-state level polities. However, past research has overlooked the time pressure of completing the construction within a given period and the challenges from scheduling conflicts with other important activities such as farming. The research presented here examined historic and ethnographic accounts to understand the seasonal availability of laborers and the allocation strategies for laborers in historic China. In addition, the research examined the time frame of public construction and source of laborers at the Erlitou urban center, 1750–1520 BCE. The results will help archaeologists reexamine the labor management strategies in prehistoric China and worldwide.

Xie, Liye [91] see Tsui, Jamie

Xiuhcutli, Nezahualcoyotl (Tulane University)

[322] *Navigating a Shifting Landscape: Tlaxcallan Trade in the Late Postclassic*

As the political landscape changed continuously in central Mexico during the Late Postclassic, polities of the region had to constantly adjust and adapt, forging new alliances and dispensing old ones. Faced with an increasingly expansive state in the Basin of Mexico, polities in the Puebla-Tlaxcala Valley likewise had to adjust accordingly. Increasingly isolated, Tlaxcallan found alternate ways to integrate into the greater Mesoamerican market system, while resisting political integration in the Triple Alliance sphere of influence. This paper assesses how Postclassic Tlaxcallan maintained this balancing act through an evaluation of ethnohistoric and archaeological evidence about the polity's interaction with its neighbors in central Mexico by considering different models and scales of interaction between Tlaxcallan and its neighbors.

[322] *Chair*

Xiyun, Yu

[33] *Kinship Organization Reflected in Bifurcated Settlements*

The bifurcated settlements of prehistoric China indicate that their internal organization is a reflection of a kind of kinship organization akin to the moieties of South America, the phratries of North America, marriage classes of Australia, and the Xing groups of ancient China. With the emergence of clans, the Xing (姓) group system was transformed to the Zhaomu (昭穆) system.

Xu, Nuo [116] see Li, Yue

Yacobaccio, Hugo [238] see Samec, Celeste

Yadmaa, Tserendagva [27] see Rosen, Arlene

Yahalom-Mack, Naama [193] see Van Horn, Mark

Yakal, Madeleine (University of California, Los Angeles)

[113] *Exotic Beads and Jar Burials: Social Elaboration in the Old Kiyangan Village, Ifugao, Philippines*

Trade and interaction are linked to the development of social ranking among premodern societies, indications for which are seen on mortuary practices, particularly on the existence of exotic burial goods. Our excavations at Old Kiyangan Village (OKV) in the northern Philippine highlands feature in-utero and infant ceramic jar burials with associated grave goods, primarily beads. The investigations reported in this presentation looks at the relationship between both the quality and quantity of the burial beads and the juveniles they were buried with. The varied amounts per grave could indicate an expression of social ranking in Ifugao society as supported by ethnographic studies of current Ifugao social classes and heirloom beads. The presence of Chinese-style glass beads in a Philippine site suggests a network of trade between Ifugao and other Philippine or Asian polities. A comparison of the Ifugao beads to other styles of Philippine and Chinese beads can provide insight on shared cultural processes, craftsmanship, and traditions. In this study we expect to see a pattern of bead quality, quantity, and style related to juvenile jar burials. This analysis will provide a better understanding of Ifugao social practices and how it compares to other Philippine sites.

Yakal, Madeleine [355] see Layco, Wendy

Yamagiwa, Kaishi**[24]** *Human Adaptation and Natural Resource Usage in Prehistoric Southern Ryukyu Islands, Southwestern Japan*

This study aims to discuss about the strategy of prehistoric human adaptation to the island environment, especially focus on the natural resource usage. I introduce the case of southern part of Ryukyu islands—the southwestern part of Japan archipelago, where the first long-term human settlement had occurred about 4,300 years ago. Prehistoric people in southern Ryukyu islands had a unique material culture (absence of pottery, use of giant clam shell adzes), which was dissimilar to the surrounding cultural groups, like the Jomon culture of the Japan archipelago or the Neolithic culture, which spread from Taiwan to Southeast Asia. This suggests that the prehistoric southern Ryukyu islands had been generally isolated. On the other hand, their unique material culture may relate to the geological environment of their islands. I suggest that prehistoric people developed a strategy suitable for surviving in these island environments, and improved their own material culture to adapt to a new ecology.

Yamamoto, Naoto (Nagoya University), Kumiko Horikawa (Nagoya University) and Takako Shimohama (Museum of archaeological research of Komatsu City)**[138]** *Ethnoarchaeological Analysis of Prehistoric Baskets from Central Japan and Basketry Techniques found at the Museum of Archaeological Research*

Many ancient baskets have been excavated from the wetland sites of the Japan's prehistoric period in the Hokuriku district, Central Japan. Sixty-five baskets have been excavated from 10 prehistoric sites and date from c. 3600 cal BC to c. cal AD 250. Also 14 impressions of basketry were found on the bottom of deep bowls from eight prehistoric sites. Two points are clear from the analysis of these basketry materials: 1) in terms of construction materials, a Inugaya (in Japanese; *Cephalotaxus harringtonia*), a Japanese cedar (*Cryptomeria japonica*), a hiba arborvitae (*Thuja dolabrata*), a silvewine (*actinidia*), and a tudurafuji (in Japanese; *Sinomenium acutum*) were used to make basketry. No baskets were made of straw, and 2) regional difference in basket materials plainly existed in prehistoric Japan, bamboos in the Tohoku and Kanto district and plant other than bamboos in the Hokuriku district. We have been using ethnographic basketry to help us understand these ancient basketry examples since these historic baskets were made with Japanese cypress, silvewine, and tudurafuji in the Hokuriku district 30 years ago. Archaeologists, who work at the museum of archaeological research of Komatsu City, have been teaching schoolchildren and the elderly how to make basketry using traditional ancient techniques.

Yan, Qipeng [115] see Zhou, Yawei

Yang, Dongya (Simon Fraser University), Antonia Rodrigues (Simon Fraser University), Anna Marie Prentiss (University of Montana), Eleanor Green (University of Montana) and Camilla Speller (University of York)**[50]** *An Archaeological Investigation into the Genetic and Dietary Histories of Dogs at the Bridge River Site, British Columbia*

Domesticated dog (*Canis lupus familiaris*) remains have been recovered from a variety of Northwest Plateau archaeological sites, including Bridge River, a complex hunter-gatherer village on the Fraser River of British Columbia. To gain insight into the genetic continuity and dietary history of these dogs, this study applies ancient DNA techniques to dog bones and coprolites recovered from two pithouses at Bridge River. Dog mitochondrial DNA (mtDNA) is used to inform on genetic relationships between domesticated dogs at Bridge River and other ancient dog populations, both in British Columbia and worldwide. Dog diet information is gleaned from salmon mtDNA sequences recovered from both coprolites and salmon bones within the coprolites. Whole genome analysis, followed by next-generation sequencing on an Illumina MiSeq platform, shed additional light on other dietary components, as well host nuclear DNA from the coprolites.

[116] *Chair***Yang, Liping (Shaanxi Provincial Institute of Archaeology) and Weilin Wang (Shaanxi Provincial Institute of Archaeology)****[279]** *A Middle Yangshao Cemetery of the Yangganzhai Settlement*

In order to better understand the moated settlement of Yangganzhai (ca. 5300–4800 BP) in the Wei River Valley of China, the archaeological team surveyed east of the moated area in 2015. A large number of pit burials with side chambers were found. The cemetery is so far the first known adult cemetery of this period (Miaodigou Phase of Yangshao Culture). Based on C14 dating and funerary goods, the cemetery is contemporaneous with the Yangganzhai settlement. This discovery provides important data for future research on Miaodigou settlement pattern, burial custom, social organization, and relatedness of populations at the time. The side chamber burials of Yangganzhai date to several hundred years earlier than other known burials of this type found in western China. They can therefore provide important archaeological data for further inquiry into this burial type's origins, as well as possible links between the ancient residents of the Wei River Valley and other groups to the west.

Yang, Miaomiao (Shaanxi Provincial Institute of Archaeology), Songmei Hu (Shaanxi Provincial Institute of Archaeology) and Weilin Wang (Shaanxi Provincial Institute of Archaeology)**[279]** *Faunal Remains from the Yangganzhai Site*

Over several seasons of excavation, a large quantity of faunal remains have been unearthed from the Yangganzhai site. These remains were all collected systematically by excavation unit and have been carefully measured and identified by taxon. The analysis of these remains indicates the presence of at least 11 species, including fresh water shellfish (*Unio douglasiae*), pheasant, crane, dog, domestic pig, roe deer, spotted deer, red deer, and cattle. The presence of some of these species suggests that the climate was warmer and damper than in present times in the Gaoling area. The bones of dogs, pigs, and cattle account for 88.89% of the total specimens, and those of pigs are the most abundant. The presence of wild animal remains also suggests that in addition to raising domestic animals, the residents of Yangganzhai also engaged in hunting activities.

Yang, Yuzhang, Zhijie Cheng, Weiya Li, Ling Yao and Juzhong Zhang**[78]** *The Emergence, Development, and Regional Differences of the Mixed Farming of Rice and Millet in the Upper and Middle Huaihe River, China*

In this research, flotation and starch analyses were conducted on samples from eight archaeological sites in the upper and middle HRV. The results indicate that the mixed farming of rice and millet first appeared in the later phase of the middle Neolithic in the regions of the Peiligang Culture, then developed quite rapidly in the late Neolithic (6.8–5.0 ka BP), finally becoming the main subsistence economy at the end of the Neolithic in the upper HRV. However, there are obvious differences in the emergence and development of agriculture between the middle and upper HRV. Rice farming was the only agricultural system during the middle Neolithic, lasting until the end of the Neolithic, when mixed farming appeared in the middle HRV. Furthermore, although mixed farming appeared in both the upper and middle HRV during the end of the Neolithic, the roles of rice, foxtail millet and broomcorn millet in the subsistence economy were not the same. In general, millet was more widely cultivated than rice in the upper HRV, but rice occupied the same or a slightly more prominent position in the middle HRV at the end of the Neolithic.

Yang, Yuzhang [78] see Cheng, Zhijie

Yanicki, Gabriel (Department of Anthropology, University of Alberta)

[339] *Follow the Women: Ceramics and Post-Fremont Ethnogenesis*

The Promontory Gray ceramic type is problematic within the narrative of proto-Apacheans at the Promontory Caves: progenitor populations of Subarctic Dene did not make or use pottery. A solution to this dilemma is readily evident in both oral traditions and genetic studies that show large-scale recruitment of women into founding proto-Apachean populations. Ceramics, normally an aspect of women's craft production, likely arrived with the women who joined them. Early dates for the peak of Promontory Culture occupation, AD 1240–1290, justify a closer comparison of Promontory ceramics to contemporary late Fremont assemblages. Given the potential for culture contact and ensuing processes of ethnogenetic change, a model is presented here to distinguish among ceramic assemblages left by groups that engaged in trade or imitation, or that featured the movement of experts themselves. While some imitative learning is evident, the earliest Promontory Gray specimens demonstrate an already refined ceramic tradition. They are a departure from locally made Great Salt Lake Gray at the nearby Fremont settlement of Chournos Springs, but are often indistinguishable from calcite-tempered Uinta Gray and a highly micaceous type known as Knolls Gray. Two areas—the Uinta Basin and Gunnison Bay—are drawn into sharp focus as loci of proto-Apachean social recruitment.

Yao, Alice (University of Chicago)

[325] *Land Use and Field Ecologies in Southwest China*

This paper complements prevailing studies on prehistoric domestication and agriculture with an eye toward the interrelated problem of land use and food security in south China. In ecologies characterized by monsoonal variability, rugged terrain, and dense vegetation, what are the conditions that challenge or enable the cultivation of a range of staples? Using archaeological, ethnohistorical, and ethnographic data, I examine how extensification of field practices enabled the cultivation of wet/dry crops such as millet, rice, and wheat during the Late Holocene. Management of these inter-cropped fields may have enabled adaptation to climatic variability and addressed long term issues of food security in the tropics.

Yao, Ling [78] see Yang, Yuzhang

Yaquinto, Brian [367] see MacDonald, Sarah

Yasui, Emma (University of Toronto) and Daniel Kwan (University of Toronto)

[33] *Microscopic Leftovers: Exploratory Starch Grain Analysis on Ceramic Vessels from the Shangshan Culture, China.*

This paper will outline trends observed in pottery technology and dietary practices of the early Holocene Shangshan Culture (11,400 to 8400 cal. BP) in the lower Yangtze Valley, China. The Shangshan people produced some of the earliest known fine ware, and it is hypothesized that communities engaged in the low-level production of rice, which began the process of domesticating this crucial cereal. To date, the nature of pottery use and rice consumption at Shangshan sites remains partially understood, but with the application of residue analysis it is possible to examine the microscopic remains of storage and cooking vessels. Therefore, being currently explored, Shangshan pottery technology through the lens of culinary practices and diet using starch grain analysis has proven particularly useful in subsistence studies of poorly or rarely preserved species. In addition to evidence for rice consumption, we are interested in elaborating on the variety of plant species being processed, and if any patterns exist in the use of particular vessel types.

Yates, Donna (Scottish Centre for Crime and Justice Research, University of Glasgow)

[310] *Discussant*

[310] *Chair*

Yates, Phoebe

[234] *The Ottoman Rule of Athens and How it Shaped the Topography of the Acropolis*

This poster will discuss the topographical changes of the Athenian Acropolis and how it affected the city's identity. The Acropolis is an iconic monument defining Athens as a city. It was erected in Preclassical times, and has been the center of religious festivals and the city itself ever since. In 1453 the Ottoman Turks conquered Athens and made it their own. Most monuments, including the Acropolis, were altered to fit the Turkish lifestyle, giving the monuments a different function than the glorified Classical period. This was horrific for the Athenians because they viewed the Classical times as a Golden era, and did not want to see it fade. All churches were turned into mosques, Turks became neighbors to Athenians, and most importantly, Christians were not allowed on the Acropolis. Today, tourists can visit the Acropolis and see the changes made during the Turkish rule. The easiest to spot is the caved-in roof and destroyed wall of the Parthenon. Due to its significant influence on the city, I've chosen to focus on the three main monuments on the Acropolis; the Parthenon, the Erechtheion, and the Propylaea. I will discuss the changes made and how the effects were felt throughout Athens.

Yduarte, Martha [368] see Ferguson, Jeffrey R.

Yellen, John (National Science Foundation)

[70] *The Framework for National Science Foundation Funding of Archaeological Research*

National Science Foundation funding for archaeological research is driven by several factors some internal and others external to NSF. The Foundation is an agency of the federal government and the amount of money authorized for expenditure and strictures on how it is to be allocated is determined by a multifaceted process which involves the Foundation itself, the President and multiple House and Senate congressional committees. Thus for each annual budget appropriation cycle, uncertainty is involved. The Foundation itself has then considerable leeway in the competitions held and the amounts allocated to individual Programs. While archaeology receives support through multiple sources within NSF the Archaeology Program constitutes the focal point and data indicate a stable funding base over many years. If the past is any predictor of the future, one might expect the pattern to continue. NSF criteria require proposal evaluation to take into account both "intellectual merit" and "broader impacts," the latter of which is defined as "benefit society or advance desired social outcomes." The hope is that the current framework is both well enough established and appropriately designed for a stable future.

Yépez Álvarez, Willy [170] see Bautista, Stefanie

Yépez Álvarez, Willy [233] see Gonzalez-Macqueen, Felipe

Yerka, Stephen (University of Tennessee)

[195] *The Current State of the Digital Index of North American Archaeology (DINAA)*

The Digital Index of North American Archaeology (DINAA) is expanding from its initial proof-of-concept phase, scaling to a truly continental effort. As a linked open data hub for information related to archaeological sites, DINAA interoperates governmental, research, and archival information sets about hundreds of thousands of archaeological sites. Although DINAA links archaeological information at a scale that was not feasible even a decade ago, its greater strengths come from a commitment to open data and open-source ethics, collaboration, and multi-stakeholder partnerships. DINAA's loose coupling of networked information forms an index through which archaeological researchers as well as the public can communicate and query disciplinary knowledge about the past, making archived data, physical collections, and documentation more readily discoverable through spatial, temporal, and cultural contexts. The project also aims to support the heritage management efforts of sovereign Tribal and other government officials. This poster reports on the current state of DINAA, highlighting current work supported by both the Institute for Museum and Library Services (IMLS) and the National Science Foundation (NSF). The poster illustrates methods to network archaeological data on a continental scale, and highlights some of the successes in building a database "by community" instead of "by committee."

[195] *Chair*

Yerka, Stephen [75] see Hegge, Oliver

Yerkes, Richard (Ohio State University), Attila Gyucha (Field Museum, Chicago, USA) and William Parkinson (Field Museum, Chicago, USA)

[178] *Social Dynamics and Archaeological Sciences at Neolithic Tells: Investigations on the Great Hungarian Plain by the Körös Regional Archaeological Project*

Investigation of social dynamics at Neolithic tells, Szeghalom-Kovácsshalom and Vésztő-Mágor, Hungary, included surface collection, geophysical and geochemical surveys, targeted excavations, micromorphology, stable isotope studies, compositional analysis, and contextual analysis of 14C dates, cultural materials, and burials. Both sites were established ca. 5200 BC, cal., and they are located on the same branch of the Sebes-Körös River, seven km apart. However, they have different dimensions and settlement layouts. At Szeghalom-Kovácsshalom a 60 ha nucleated settlement complex surrounds a small tell. The larger Vésztő-Mágor tell was enclosed by encircling ditches, but there is no adjacent flat settlement. Spatial analysis using GIS documented rapid horizontal settlement expansion ca. 4800 BC, cal., while micromorphological studies and calibrated 14C dates revealed rapid vertical growth at both tells. Archaeometric and contextual analysis provided vital data used to examine the archaeological correlates of social complexity. There was some evidence for social differentiation and for ritual activities led by emerging elites. However, this first occurrence of population nucleation did not lead to institutionalized hereditary inequality and powerful rulers at the tells. On the Great Hungarian Plain, this occurred during the Bronze Age. Nonetheless, population nucleation did contribute to the emergence of new ideas about sociopolitical organization.

[264] *Discussant*

Yeshurun, Reuven (University of Haifa) and Melinda Zeder (Smithsonian Institution)

[340] *Fox Overabundance and Human Response in the Earliest Villages of the Near East*

Ethnological and ecological studies point to the proliferation of small mammalian carnivores, most notably red fox (*Vulpes vulpes*), in human-modified environments. Foxes prey on human trash and consequently their populations in and around settlements are denser, their survival rate is improved and their foraging territories contract, centering on refuse dumps. This carnivore overabundance leads to a series of effects on the local ecosystems. The foxes' strong commensal relationship with humans highlights the unintentional but highly effective alteration of the ecosystem by human communities. Here we investigate archaeologically when and how the impact of human settlement refuse started to significantly affect the local fox populations. We also examine humans' response to this phenomenon. Fox overabundance and commensalism are evident as early as the first permanent hunter-gatherer settlements appear in the Near East, ca. 15,000 years ago, preceding the appearance of agricultural villages. We demonstrate that, consequently, humans habitually used foxes as resource. Thus, terminal Pleistocene and early Holocene hunter-gatherers unintentionally created an overabundance of foxes and then managed to use this side effect of sedentism to their favor, by including foxes in their broadening subsistence base.

Yeshurun, Reuven [332] see Nadel, Dani

Yeske, Kate

[47] *Alaskan Game Drives: An Architectural Assessment*

Ethnographic accounts of communal hunting activities in Alaska are abundant, yet archaeological evidence of this practice is scarce. The inuksuit—elaborate stacked rock cairns—that demarcate many game drives in Alaska provide evidence of these important traditional subsistence strategies. Improved documentation of these features will facilitate a better understanding of not only their function but their meaning to the original builders and implementers of game drive systems. Comprehensive investigation of game drive sites and spatial analyses of their features point to patterns that reflect local landscape use and broader regional trends.

Yesner, David [194] see Wells, Joanna

Ying, Wang [25] see Dong, XinLin

Yoko, Sugiura [145] see Jaimes Vences, Gustavo

Yoneda, Minoru [358] see Takigami, Mai

Yoshida, Kunio [332] see Kato, Hirofumi

You, Yue [116] see Li, Yue

Young, Eric E. (Arcadia University)

[14] *Further Defining the Role of the Forensic Archaeologist*

As the use of archaeologists in forensic matters grows, it is important to define the role the archaeologist ought to play in such situations. Archaeologists should educate law enforcement personnel as to their utility in investigations. It is important that archaeologists understand their usefulness in criminal matters, and even more importantly, archaeologists should understand their limitations in investigations. There is a need to establish guidelines as to what archaeologists should/should not do while involved in criminal cases. It is also important to attempt to separate the roles of the forensic archaeologist and the forensic anthropologist. It appears that many, including practitioners in both fields, do not know where to limit the roles of each. A discussion of these matters will further the progression of the field of forensic archaeology.

Younie, Angela (Far Western Anthropological Research Group), Jack Meyer (Far Western Anthropological Research Group) and Brian Byrd (Far Western Anthropological Research Group)

[294] *Mound-Building, Site Structure, and Land-Use Patterns in the Sacramento-San Joaquin Delta*

Mound sites are a notable characteristic of mid- to late-Holocene occupation throughout the Central California. Most recent archaeological research on the region's mounds has focused on their dense clustering along the San Francisco Bay margins; in contrast, much less attention has been focused on the mounds of the adjacent Sacramento-San Joaquin River Delta. Although often grouped together, few systematic studies have been undertaken to evaluate differing site patterning, the structure of mortuary practices versus residential activities, and the impact of local landscape features on the distribution and visibility of mounded middens. Mounds along the San Francisco Bay are often considered to occur in clusters complete with densely deposited shell and earth middens, non-mounded cemeteries, and petroglyphs. Although of a similar age, mound sites in the productive but otherwise marshy mosaic of streams and wetlands in the Delta region appear to have differing structural signatures. Naturally formed relict sand dunes provided viable dry land for habitation and were repeatedly occupied over time. Though geoarchaeological modeling and exploration of site structure, our research focuses on the Hotchkiss cluster of dune-mounds in the South Delta, and then applies these results to a broader consideration of dune-mound patterning throughout the Delta.

[294] *Chair*

Younie, Angela [252] see Sattler, Robert

Yu, Chong (Sun Yat-sen University)

[116] *Study on the Subsistence of Neolithic and Early Bronze Age China Using Published Mammal Records*

This research is based on all published zooarchaeological study on Chinese Neolithic and Early Neolithic sites and mainly focuses on the animal subsistence economy in the same period. With the advent of quantitative analysis, refined models can now be built and analyzed from all the published data. The application of big data studies on animal remains provided information of range and relative importance of taxa and their possible change through time-scale and region which may reflect an ancient environment around sites, subsistence economy of ancient people as well as consumption patterns within sites which can be used to evaluate the relative importance of animals in the diets obtained through various subsistence strategies. At the same time, animal origins and dispersal can also be traced, which may help to understand the antiquity of changes related to domestication.

Yu, Pei-Lin (Boise State University)

[208] *Behavioral Ecology of Neolithic Transformations in Taiwan: Ceramics and Settlements*

Six thousand years ago, encounters between Paleolithic Taiwanese foragers and seafaring farmers of Mainland China ushered in a new agricultural lifeway. Two hallmarks of the early Taiwanese Neolithic are sedentary settlements and red cord-marked ceramic wares. How quickly did foragers adopt these cultural traits? Did they adopt them together or separately? Archaeological data from the Neolithic transition are scarce, but ethnographic information suggests that the rate of change is affected by considerations of costs and benefits compared to the existing lifeway. This paper uses projections from Lewis Binford's Hunter-Gatherer database to offers hypothetical predictions for mobility and subsistence of Taiwan's Paleolithic foragers, and the tempo and mode of adoption of ceramic technology and sedentized living.

[208] *Chair*

Yu, Pei-Lin [50] see Ryan, Ethan

Yuan, Jing (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing, China)

[116] *Chair*

Yuan, Jing [116] see Zhao, Xin

Yue, Hongbin [72] see Ledin, Lauren

Zaburliin, Maria Amalia [222] see Albeck, María

Zalaquett, Francisca

[347] *Sounds in Context: Musical Instruments from Teotihuacán*

In this paper we present the advances in the organological, acoustic and contextual analysis of musical instruments excavated by Dr. Linda Manzanilla in the sectors of Teopanacazco, Oztoyahualco, Tunnels, and Xalla, all of them located in the archaeological site of Teotihuacán. These instruments were part of a complex system of sound communication that often accompanied the rituals and daily activities. We propose some interpretations on the use of certain instruments and their relationship with other materials excavated in the same context.

Zalaquett Rock, Francisca [349] see Domínguez, María del

Zambrana, Jorge [326] see Miranda Tapia, Ivonne

Zambrano Anaya, Raúl [230] see Núñez Aparcana, Bryan

Zangrando, Atilio, Augusto Tessone (INGEIS-CONICET, Pabellón INGEIS, Ciudad Universita), Angélica Tivoli (CADIC-CONICET), Jonathan Nye (University of California, Merced.) and Suray Perez (Facultad de Filosofía y Letras, Universidad de Bue)

[284] *Subsistence Variations and Landscape Use of Marine Foragers in Southern South America: New Perspectives from an Isotopic Zooarchaeology*

Predictions based on resource distribution and abundance throughout patches (i.e., patch choice model) are critical to model human-specific decisions. However, information about past abundance or distribution of preys is rare, and archaeological evaluations are normally based on modern ecological parameters. This procedure can face some problems since species distributions are likely to have fluctuated along time as a consequence of different environmental factors, or as the product of human predation. Stable isotope studies have the potential to address this problem providing a suitable paleoecological framework. We present and discuss stable isotope analyses from zooarchaeological samples of coastal and marine resources dated to the past 6,000 years with the aim to investigate possible variations in the patch use by marine hunter-gatherers in southern South America. A number of studies have suggested that variations in carbon and nitrogen values among marine animals can be explained by differences in the isotope composition between nearshore and offshore ecosystems, or by changes in trophic levels. Since stable isotope analyses are used here as paleoecological markers for assessing the distribution of animal resources in the past, this method allows us to identify the use of marine patches for foraging activities by hunter-gatherers along the Holocene.

Zanotto, Hannah [335] see Craig, Douglas

Zaragoza, Diana (INAH) and Kim Richter (Getty Research Institute, Los Angeles)

[135] *Precolumbian Huastec Metallurgy*

Although the Huasteca may have had an important role in the emergence and development of metallurgy in Precolumbian Mesoamerica, little has been published, apart from Dorothy Hosler and Guy Stresser-Péan's short study on Huastec metallurgy (1992). They proposed that the Huasteca was second earliest region in Mesoamerica after West Mexico to produce bronze alloys artifacts during the Postclassic period. Their research positions the Huasteca as an early adopter and innovator of this technology. We follow up on this early important research by reviewing the known corpus of metal artifacts from the Huasteca ranging from copper alloys, silver, and gold objects and by investigating the possible relationship between the Huasteca and mining centers, such as Guadalcázar, and other metal-working regions, such as Guerrero and the American Southeast to identify patterns of technological exchange. We also analyze the representations of Huastec metal objects in precolumbian and Early Colonial artworks to illustrate how metal objects were used and to gain insight into stylistic interchange between the Huasteca and other parts of Mesoamerica. We argue that the analysis of Huastec metal objects confirms that the region was deeply integrated in Mesoamerican exchange networks and that it developed local technical and artistic innovations in metal.

Zarger, Rebecca (University of South Florida) and Kristina Baines (Guttman College, CUNY)

[162] *Perceptions of Changing Landscape Mosaics in Southern Belize*

What drives human uncertainty when confronting gradual change versus catastrophic, rapid change? Based on longitudinal ethnographic data that includes household behavioral observations, oral histories and structured survey interviews of land use change, and continuous participant observation data, we describe the ways farming families in southern Belize have responded to changing environments over time, within the context of a mosaic of livelihood strategies. Ethnographic interviews with community members focused on their perceptions of environmental change over their lifetimes and responses to agricultural uncertainty from drought, hurricanes, or other events. These are juxtaposed with ongoing political conflict with nation state and other actors over heritage and identity, territory, and misperceptions of land use practices since the 1980s in southern Belize. We consider the following questions in our paper: How did Maya farmers, their institutions, and the landscape itself respond to a changing environment? What does this suggest about future resilience in the face of predicted future climate changes?

Zaro, Gregory (University of Maine), Martina Celhar (University of Zadar), Kenneth Nystrom (State University of New York at New Paltz), Dario Vujevic (University of Zadar) and Karla Gusar (University of Zadar)

[282] *From Liburnian to Ottoman: Unraveling Settlement History at Nadin-Gradina, Croatia*

Ancient cityscapes with long occupational histories have great potential for reconstructing changes in social structure, spatial planning, political governance, identity, economy, environment, and climate. Recovering such information, however, poses many challenges, both human and financial. Archaeological deposits are often deeply buried and palimpsestic, representing a complex mixture of processes including collapse, partial abandonment, repurposing, and reoccupation. Yet, anthropological inquiry into human societal organization and its coevolution with the physical world demands that archaeologists sort out occupational history and changes in the built environment with some degree of chronological precision. Such are the challenges, and opportunities, at the Nadin-Gradina archaeological site in coastal Croatia, where ongoing fieldwork is beginning to define the temporal parameters of its construction and evolution over the course of approximately 2,500 years—from a Liburnian hill fort in the first millennium BCE to an Ottoman frontier settlement in the sixteenth and seventeenth centuries. The results permit a series of more robust anthropological questions related to human response and adaptation to urbanization, landscape change, and climate over a span of centuries to millennia, while also opening the door to questions of cultural identity, colonization, and migration.

Zaro, Gregory [53] see Countryman, James

Zarrillo, Sonia (University of Calgary)

[270] *The Secret Life of Cacao in the Ecuadorian Upper Amazon*

Genetic studies suggest that cacao (*Theobroma cacao* L.) domestication occurred in the Upper Amazon of southeastern Ecuador and northeastern Peru and was then transported by humans northward to Central America and Mexico. As such, we should expect to find the earliest archaeological evidence

of cacao use in the tropical forests of South America. This paper presents starch granule evidence for the early use of cacao from the Upper Amazon site of Santa Ana-La Florida during the Ecuadorian Early Formative Period.

Zatorski, Jezelle (Stantec Consulting Ltd.) and Keli Watson (Crossroads CRM)

[387] *Living Landscapes and Moving Cultures*

Culturally Modified Trees (CMTs) in the Central Interior of British Columbia are well-known and extensively documented. While there are several types of CMTs, the most common in the interior, by far, are barked stripped Lodgepole Pine for the purpose of cambium collection as a food resource. The majority of the discussion and analysis of CMTs is field-based and primarily focuses on scar identification to determine cultural origin, dating methods, mapping and describing locales where large numbers of CMTs are found in mass quantity. What has been lacking is an attempt to consider these CMT sites as an integral part of the cultural landscape of Central Interior First Nations. In this paper we will explore the potential use of geospatial data to examine CMT sites in terms of regional distribution and land use patterns. The Carrier Nations in the Central Interior of British Columbia are known to have followed a seasonal round, focusing on different resources in different parts of their landscape at different times of the year. Cambium collection is an important, and overlooked, part of their holistic interaction and understanding of their surrounding landscape.

Zavala, Bridget M. (Universidad Juarez del Estado de Durango)

[352] *Searching for the Big House: Ritual Spaces of the Sextin Valley, Durango, Mexico*

Many archaeologists have recorded plazas, altars, and rock art in Durango's prehispanic landscapes. These spaces are often characterized as settings for ritual activities. Nevertheless, few researchers have posited the kinds of activities that were carried out in these spaces. In this paper I analyze data from excavation of the sites of Corral de Piedra and Los Berros in the Sextin valley in northern Durango, Mexico. The materials, architecture and spatial distribution suggest a variety of different ritual actions that made these spaces meaningful to the agents that built these locales. I consider recent ethnographic work among contemporary groups in the region to illustrate the modern-day use of analogous spaces in search for meaningful interpretations of specialized features in the precolumbian past.

[352] *Chair*

Zavaleta, Enrique [170] see Uceda, Santiago

Zavodny, Emily (Penn State University) and Sarah B. McClure (Penn State University)

[284] *The Cultural Ecology of Croatia's Cattle: Stable Isotope and Zooarchaeological Analyses of an Indigenous Breed*

Here we present results from a preliminary stable isotope and zooarchaeology study of cattle from the Lika region of northern Croatia. During routine investigation of Bronze and Iron Age faunal assemblages, we identified bones belonging to a small unspecified cattle breed. These same specimens also have unexpected stable carbon and nitrogen isotope signatures, and are more similar to both domesticated and wild browsers than grazing cattle in other regions. We argue that these adaptations were exploited and encouraged by local populations, who adopted these cattle as part of a larger economic strategy tailored to the harsh and unpredictable environment of Lika. We conclude with a brief overview of the modern buša cattle, the most likely successor to our specimens and a heritage breed that is still raised in Lika today.

Zawadzka, Dagmara (Université du Québec à Montréal [UQAM])

[28] *Embodiment in Animic Rock Art: An Example from the Canadian Shield*

Perceptions of self and of personhood are fluid within animic ontologies that tend to stress spiritual similarities between humans and nonhumans. This fluidity is reflected in concepts of bodies. Bodies endow their owners with particular qualities, perceptual skills, behaviors and ultimately, identities. Beings can transform their bodily appearance, therefore what is perceived by an onlooker does not necessarily correspond to the being that is perceived. In the Canadian Shield, depictions of anthropomorphic bodies range from simple schematic stick figures to elaborate idiosyncratic images where clothing and facial features are indicated. Bodies are also evoked in images of heads, hands and probable vulvas. In this paper I will attempt to shed light on how embodiment was enmeshed within rock art by looking at bodily experiences depicted in rock art; at the effects that rock art could have had on living bodies; and at the importance of the kinetic process of creating rock art for upholding relationships with other-than-human persons. The experiences and motivations that led to the creation of rock art, as well as the process itself, ultimately reveal the agency of rock art.

Zawadzka, Dagmara [175] see Gagnon, François

Zazula, Grant [47] see Graf, Kelly

Zborover, Danny (Institute for Field Research)

[137] *Two Figurines and a Conquest: Toltec and Aztec Warriors in the Sierra Sur of Oaxaca?*

In this talk I will present a contextual and iconographic analysis of two unusual, yet almost identical, figurines of lavishly dressed warriors, reported from different sites in the Chontal Highlands of Oaxaca. While variations on mold-made solid figurines of armed individuals were common in Late Classic Oaxaca, the particular attributes of these figurines are more analogous to militaristic iconography emerging from Postclassic Central Mexico. Taking the figurines' iconography and regional historical documents as a point of departure, I will evaluate possible scenarios for both Toltec and Aztec geopolitical interventions in the region. Finally, I will argue that these new data paint the eastern Sierra Sur not as the geographical obstacle it may have appeared in the recent past, but rather as a highly-traveled and coveted bridge between the Isthmus, the highlands, and the coastal regions of southern Mexico.

Zborover, Danny [70] see Boytner, Ran

Zeballos, Carlos [371] see Gillam, Christopher

Zedeño, Maria Nieves (University of Arizona)

[286] *Cooperation and Order among Communal Bison Hunters*

This paper discusses the trajectories and intersections of cooperative practices and ordering strategies among prehistoric communal bison hunters. Utilizing the vast and ancient record of bison hunting in the region and particularly in Montana, the paper specifically focuses on the rise of large-scale

bison harvests in the northwestern Plains of North America, and the effect of hunting technology on social cooperation at various scales (kin, band, supra-band). As well, the paper delves on the institution of strategies for managing the success of surplus production for consumption, storage, and exchange. The equally vast historic and ethnographic records of bison hunters in the region are tapped to unpack the role of gender in the structure of individual, kin, and non-kin cooperative practices and ordering strategies along the economic, ritual, and political realms of social life.

Zeder, Melinda [340] see Yeshurun, Reuven

Zegarra, Edward (Binghamton University)

[359] *Archaeological Ethnography for a Decolonizing Methodology in the Central Highlands of Peru*

Ethnographic research is herein demonstrated to contribute a crucially important initial step in the reconstruction of indigenous histories and to building a praxis of collaborative archaeology. Ethnographic research was conducted during two field seasons in 2015 and 2016 in and around the sprawling ruins of the capital city of the Wari Empire in the central highlands of Peru to reach an understanding of the contemporary cultural idiosyncrasies pertinent to the Peruvian historical context. Collaborative archaeology has made great strides to address issues of the colonial embeddedness of archaeology, the decolonization of our discipline, and the social integration of descendant communities in prehistoric cultural research in the recent past. As a result, the discipline of archaeology has begun to adopt research methods that integrate native populations at every stage of the research in order to address these differences that split history into two parts in settler nations. However, multi-scalar ethnographic research prior to attempting collaborative ventures have not yet been fully adopted by most researchers and it is the purpose of this presentation to demonstrate their validity and relevancy to establishing mutually beneficial, rather than need- or guilt- based, relationships for the protection and preservation of archaeological sites.

Zegarra Zegarra, Michiel [308] see Gorman, Alicia

Zeidler, James A. (Colorado State University)

[384] *Animal Imagery and the Mythic Level of Jama-Coaque Figural Style*

The mythological and iconographic analyses of Peter G. Roe have made seminal contributions to our understanding of Amerindian cosmology and religious thought in South America, both in the ethnographic present and in the prehispanic past. His unitary mythic model set forth in the *Cosmic Zygote* (1982) and explored in subsequent publications has convincingly demonstrated that this quintessentially Amazonian model has “deep-time” attributes that shed interpretive light on iconographic representations expressed in prehispanic Central Andean cultures such as Chavin and Moche. Less certain is its applicability to ceramic figural styles and iconographic representations found in post-Formative coastal Ecuadorian cultures such as Jama-Coaque where a particularly rich assemblage of human, plant, and animal imagery is found, albeit from looted artifacts now curated in national museums. This paper explores the iconographic interpretations of Andrés Gutiérrez Usillos (2011) in his impressive compendium of Jama-Coaque figural sculpture from the Banco Central museum collections entitled *El Eje del Universo: Chamanes, sacerdotes y religiosidad en la cultura Jama Coaque del Ecuador Prehispánico*. Roe’s mythic model is then brought to bear on this body of work to determine whether the model can provide an alternative interpretation of these Jama-Coaque “gods and mythic beings” expressed in ceramic sculpture.

[148] *Discussant*

Zeleznik, W. Scott [80] see Reed, David

Zender, Marc (Tulane University)

[5] *A Diachronic Interdisciplinary View of Maya Foodways*

This paper reviews archaeological, iconographic, epigraphic, and linguistic evidence for Maya foodways, documenting both the remarkable stability of some traditions and the equally significant changes in others, mostly due to cultural contact, civilizational rupture, and generational shift during some two millennia of Maya history. Although hardly a frequent topic of Maya monumentality, with a few notable exceptions, numerous ceramic vessels, murals, and graffiti depict and/or hieroglyphically reference Classic comestibles and beverages, and modern Mayan languages share numerous terms for these items, suggesting a long antiquity for various foods and drinks. Similarly, archaeologists have long documented the instruments and places of consumption, and have had surprising success in recent years in the direct chemical identification of ancient foodstuffs. Less clear has been the social settings for which various foods were considered appropriate: legacies of several periods of contact with Central Mexican culinary traditions (in the Early Classic and Postclassic periods), and the wholesale transformation of the royal court and its cuisine in the wake of a disastrous early ninth century civilizational collapse. And yet, surprising details about the dynamic social and political roles of food emerge if one takes a diachronic view informed by evidence from several distinct but complementary disciplines.

Zeng, Lingyi (Yale University)

[213] *EDXRF Analysis on Ceramics during the Mongol Period in China*

In this paper I will present the results from analyzing and comparing ceramics from multiple contexts, including ceramic production centers, burials and residential areas during the Mongol period. I adopted Energy-Dispersive X-ray fluorescence (EDXRF), a very effective and nondestructive way to analyze the chemical compositions of their pastes, glazes and pigments of samples from Jingdezhen, Inner Mongolia, and other areas of the Mongol Empire. Other scientific techniques and statistic methods also applied to analyze the provenances of them and to distinguish the official wares from wares intended for commercial use. My research not only focused on how objects were produced, consumed and exchanged, but also attempted to understand the underlying sociopolitical factors that affected these processes over time and space, which I believe will contribute to the understanding of this multiethnic society.

Zeng, Wen [115] see Zhao, Yongsheng

Zhai, Shaodong (Institute of Archaeology, Chinese Academy of Social Sciences)

[36] *From a Strategic Passage to a Remote Town: The Status Change of Dunhuang in the History of China and West Communication Reflected from the Beacon Ruins in Dunhuang*

Silk Road played an important role in the ancient China and West communication. Dunhuang is located in the most western part of the Hexi Corridor, which is a valley between Qilian Mountain and Beishan Mountain. It connects the countries of the Middle Asia, Europe and Africa in west and the East Asia in East. Beacon ruin is the most important type among the archaeological ruins, and played a key role in protecting the Northwest frontier and the Silk Road accessibility. Among the 182 ruins of Dunhuang found in the third cultural relics general investigation in China, there are 76 beacon ruins

(some were used in multi-dynasties), including 44 beacon ruins dated to Han Dynasty, 15 dated to Jin, and 18 dated to Qing. The different beacon ruins number reflects the status change of Dunhuang in the History of China and West communication.

Zhang, Dongju (Lanzhou University), Guanghui Dong (Lanzhou University), Qianqian Wang (Qinghai Provincial Institute of Cultural Relics an), Xiaoyan Ren (Qinghai Provincial Institute of Cultural Relics an) and Fahu Chen (Lanzhou University)

[78] *Prehistoric Human Adaptation to Tibetan Plateau Environment Indicated by 151 site in the Qinghai Lake Basin*

Current study indicates that Northeastern Tibetan Plateau (NETP) is one of the first widely occupied places by prehistoric people on the Tibetan Plateau. This makes NETP very important to understand the human history on the plateau and human adaptation to high elevation environment. Hence, 151 site, a paleo- to Epi-Paleolithic site in the Qinghai Lake basin on NETP, was chosen to excavate. Thousands pieces of animal bones, hundreds pieces of stone artifacts and several possible hearths were unearthed and obtained during two excavation seasons. Carefully redating of the site shows that it was first occupied shortly around 15 ka BP, then reoccupied from 9000–6000 BP more intensely. Preliminary study of the site suggests that the first appearance of human in Qinghai Lake basin is closely related to the amelioration of the Last Deglaciation and the prevalence of microlithic technology in North China, which may enlighten the study of early human migration on to whole plateau.

Zhang, Guowen (Department of Archaeology and Museology, Nankai University)

[117] *Carbon and Nitrogen Isotopic Analysis on Human and Animal Bones of Nanwa Site, Henan Province, China*

The Nanwa site (1680 BC) Song Dynasty; located in Dengfeng city, Henan Province, China, provided a valuable opportunity for the Xia Dynasty and the Chinese civilization investigation. We could provide effective evidence for the food resources utilize pattern and agricultural economy development. Stable isotopic carbon, nitrogen analysis of 14 animals and 22 human bone collagen from the Nanwa site indicated that, wild animals (–19.9‰, 4.4‰, n = 1) have a C3-based terrestrial diet. Domesticated pigs (–7.6±0.6‰, 6.6±0.4‰, n = 7) have a diet of predominated C4-based foods, as well as the sheep (–6.9‰, 6.2‰, n = 1), cattle (–9.0‰, 7.8‰, n = 1), and dog (–6.6±0.5‰, 6.9±0.3‰, n = 2), which is likely obtained from human feeding. The $\delta^{13}C$ and $\delta^{15}N$ value of the human from the Erlitou, Later Shang and to spring and autumn period is –12.1±4.1‰, –11.6±1.3‰, –7.5±4.9‰ and 5.5±1.3‰, 6.8±0.3‰, 6.8±0.9‰, indicated that they mainly relied on C4 foods, probably millet or few animals fed on C4 plants. We also found that the Nanwa of the Erlitou to Late Shang Dynasty had consumed few C3 foods, which indicated a mixed agricultural economy, probably supplied by rice, beans, and wheat. Compared to other archaeological culture people, the Nanwa had a different animal husbandry and agricultural economy pattern.

Zhang, Hua (Simon Fraser University)

[115] *Osteoarthritis, Labor Division, and Occupational Specialization of the Late Shang China: Insights from Yinxu (ca. 1250–1046 BC)*

This study investigates the prevalence of osteoarthritis of commoners at Yinxu, the last capital of the Late Shang dynasty (ca. 1250–1046 BC), to study lifeways and stress of early urban populations in ancient China. A total of 197 adult skeletal human remains from five sites were analyzed to examine eight joints of upper and lower limbs in addition to three indicators of spinal osseous changes. The clear sex difference of elevated osteoarthritis prevalence in males indicates a strong gender division of labor. In addition, the distinctive osteoarthritis pattern of higher upper limb/body osteoarthritis reveals possible occupational specialization that involves repetitive lifting and carrying heavy-weight objects. When archaeological contexts are incorporated, the skeletal population from the Xiaomintun site with this distinctive pattern can be identified as a bronze-casting artisan group. Relatively higher osteoarthritis of the Xiaomintun females (when compared with nonspecialist females) may also suggest that those women might also have participated in bronze-casting workshop activities. Such a family-involved occupation, if it existed, may have contributed to the establishment of lineage-based and occupation-oriented neighborhoods as proposed by many Shang archaeologists.

[115] *Chair*

Zhang, Jian (History School-Zhengzhou University & East Asian Studies-University of Toronto), Chen Shen (Royal Ontario Museum, Canada) and Songan Jin (History School of Zhengzhou University, China)

[78] *New Archaeological Evidence of Prehistoric Cultural Interactions in the Middle of Han River Valley, Central China*

During 2007–2009, the Gouwan Site in Xichuan County, Henan province, was excavated by archaeologists from Department of Archaeology, Zhengzhou University. Located in the middle of Han River valley, the site represents prehistoric cultural manifestations of Yangshao, Qujialing, Shijiahe and Wangwan III in their four developmental sequences although remains of the earliest Yangshao are the most abundant. While the Yangshao and Wangwan III were part of north cultural system in the Central Plains, Qujialing and Shijiahe Culture were of the South China cultural representations. The important part of this archaeological discovery is to have different cultural elements from both north and south regions at the Gouwan site. Furthermore, trenched settlement of Yangshao in middle Han River valley was identified at the site for the first time. This feature, along data resulted from other relatively clear spatial analyses provided a case study of regional micro settlement patterns and their social changes. Therefore, these new data derived from the Gouwan site provide new archaeological evidence of prehistoric cultural interactions in the middle of Han River valley.

Zhang, Jinglei [30] see Fuller, Benjamin

Zhang, Lei

[33] *A Brief Analysis of the Evolution of Bird Design in Ancient Chinese Head-Ware*

The bird design, as a distinctive and time-honored decoration in the Chinese culture, has its unique national forms and artistic glamour, which had also condensed and accumulated rich and profound connotations. Being an indispensable part of the ancient Chinese civilization, the head-ware of ancient Chinese women had evolved continuously in the transmission of cultural heritage. Which, reflecting not only the changes in people's aesthetics, but more importantly, the ever-developing ideology and culture along the various historical periods through the lens of plastic arts. The bird design, an important graphic pattern used in the head-ware of ancient Chinese women, has significant meaning embedded in its changes and evolution as a representative case.

Zhang, Li (Zhengzhou University)

[72] *The Landscape of China's Participation in the Bronze Age Eurasian Network*

In the last decade, much has been learned about the network of interactions in Bronze Age Eurasia, and the importance of the steppe pastoralists in the creation of this network. However, the mechanisms that enabled societies in ancient China (both those bordering on and distant from the steppe) to participate in the Bronze Age Eurasian arena are still poorly understood. Based on the latest archaeological discoveries in China, this article focuses on the participation of four regions of ancient China: the Ejin River Transfer Zone (ERTZ); the western Hexi corridor; central Inner Mongolia; and the middle Yellow River valley. The article analyzed all significant innovations, materials, and technologies transmitted via the Eurasian network and adopted in ancient China, with an emphasis on metallurgy and the variations in the mechanism of its adoption across different societies during the Bronze Age.

Zhang, Quan**[117]** *Investigating the Diet and Health of Neolithic Boar in Central Turkey: A Pilot Study from Boncuklu Höyük*

Boncuklu Höyük (the ninth millennium to the eighth millennium cal. BC) is an Early Neolithic settlement found in the Konya Plain, Central Anatolia. At this site, wild boar (*Sus scrofa*) is the most common species found in the mammal remains. This pilot study tries to explore the relationship between Boncuklu boar and the community that inhabited this area. Samples of archaeological boar's teeth from Boncuklu Höyük are analyzed using three methods: 1) dental morphometrics, 2) dental microwear analysis, and 3) Linear Enamel Hypoplasia, of which dental microwear analysis is the focus in this initial study. These methods allow insights into the diet and health condition of Boncuklu boar. As omnivores, boar have potential to compete with humans for food. Especially, the initial cultivation of crops in Boncuklu probably aggravated this competitive relationship. It is likely that intensive boar hunting aimed to control their population, while no evidence shows they were closely managed by humans. The study of Boncuklu boar potentially reveals the subsistence strategy of the Boncuklu community and the early pig domestication in Central Anatolia.

Zhang, Xu (Institute of Archaeology, Chinese Academy of Social Sciences), Yajun Zhang (Institute of Archaeology, Chinese Academy of Social Sciences) and Tao Tong (Institute of Archaeology, Chinese Academy of Social Sciences)**[115]** *Preliminary Analysis on the Health Status of Human Skeletal Remains from Ali Region of Tibet*

The Tibet Autonomous Region is located on the Tibetan Plateau, which is one of the most active areas in the development and interaction of ancient cultures. Human remains from Gur-gyam cemetery (1800±BP) in Gar County (often known as "Ali"), Ngari Prefecture of the western Tibet Autonomous Region of China is a group of inhabitants during the Xiang Xiong Kingdom period. It lies in front of a modern Bon monastery of Gur-gyam, which affirmed the capital of the ancient Xiang Xiong Kingdom based on both local Bon adherents' oral tradition as well as archaeological evidence, which have significant academic value for studying the archaeological culture before imperial Tibet. This study investigates the health condition of ancient humans from Gur-gyam cemetery by studying dental disease. The results show that meat was the main part of their food supply, while there was still a number of carbohydrates in their diet; and the results indicate that the agricultural, which the ancient population from Ali area had, probably arrived at the mutual level. It not only provides an evidence of the human health status in the Xiang Xiong Kingdom, but also helps greatly to establish a new understanding of health conditions of ancient residents in this region.

Zhang, Zhe**[116]** *Mass Procurement and Feasting at Houtaomuga site, Northeast of China*

Houtaomuga is a late Neolithic site located in the northeast of China. A special feature G2 has produced a large sample of aurochs (*Bos primigenius*) skeletal remains. Examination of the assemblage in G2, including bone quantity, surface modification and mortality profile suggests a site of mass aurochs procurement that took place during late summer to fall. Feasting is suggested to be a likely reason that could lead to this mass deposition.

Zhang, Zhouyu and Jianli Chen**[58]** *How the Han Empire Managed the Large-Scale Iron Production: A Study Report of Iron Smelting Sites in Shandong Province and Henan Province*

This paper is mainly about a study report of several iron smelting sites in Shandong and Henan province. By analyzing archaeometallurgical remains from large-scale iron production sites, this presentation tries to clarify issues under-addressed in previous excavation reports and shed new light on the iron technology, production organization, and the management of Iron Offices of the Han Empire that led to the developmental peak of iron industry in Chinese history.

Zhao, Chao**[33]** *The Emergence of Blade Industry in Late Upper Paleolithic Central Plain of China*

The lithic remains of blade manufacturing have been found in the Central China Plain dating to roughly 25 ka BP. Based on chaîne opératoire analysis of lithic assemblages from Dongshi and Xishi sites, the blade industry in this region shared many features in common with typical blade industries of Western Eurasia. Such discovery challenges the presumption that the hinterland of East Asia lacked the development of blade industrialization during the Paleolithic age. The emergence of blade crafting reflects a great change in technical tradition in North China and begs the question of whether this change was caused by cultural transmission from the north and west or whether it was stimulated by a shift in local adaptive strategy. By comparing the lithic assemblages in larger temporal and spatial frames, as well as by exploring the technical organization of blade manufacturing in the Central China Plain, it is argued that the emergence of the typical blade industry in this region was influenced more by cultural transmissions from the Eurasian Steppe. Additionally, environment changes of the Central China Plain at 25 ka BP created a positive condition for the local people to accept this new technology and reform it in later periods.

Zhao, Congcang [26] see Chen, Kunlong

Zhao, Xin (Institute of Archaeology, Chinese Academy of Social Sciences, Beijing, China)**[116]** *Ancient DNA Studies of Domesticated Cattle in Northern China*

This study aims to use ancient DNA techniques to characterize the genetic features of ancient domesticated cattle in order to trace the origin and spread of cattle in ancient China from eight Late Neolithic and Bronze Age sites in Northern China. DNA was successfully extracted from ancient cattle bone or tooth samples in dedicated ancient DNA labs following vigorous protocols for contamination controls. This study was focused on amplifying mitochondrial D-loop using standard PCR techniques. Among the obtained mtDNA sequences, several haplogroups could be identified including haplogroup C, which belongs to *Bos primigenius*. Our analysis indicated that there were different ways cattle might have been brought into China. In addition, this study also demonstrated the unique contribution that ancient DNA analysis can make, when combined with archaeological contexts, to our understanding of the origin and history of domesticated animals and to the reconstruction of human-animal interactions in the past.

[116] *Chair***Zhao, Yichao (Shandong Institute of Cultural Relics and Archaeology)****[213]** *Use-Wear Analysis on Cooking Vessels of the Longshan Culture: Case Studies on the Tonglin Site*

Some preliminary research on ceramic vessels of the Longshan culture had indicated li vessels as the most important type of cooking vessels. Vessel's categories might not exclusively indicate a vessel type. As was observed for the Tonglin site, an important site of Longshan culture at Linzi, li, guan, and pen vessels are the most abundant categories type. However, li vessels of Tonglin site have small rim diameter sizes on average, and it is necessary to collaborate use-wear analysis for defining li, guan, and pen vessel type. It is confined to the double handled guan and the three-legged pen with use-

wear marks, which indicate possible specifically used for cooking practices. Moreover, use-wear analysis performed on ceramic vessels shows that the main difference between li, guan, and pen vessels was a mix of dry or wet cooking modes.

Zhao, Yongsheng (Shandong University), Wen Zeng (Shandong University) and Shangwu Jiang (Shandong University)

[115] *A Study of Kneeling Facet Observed on Bronze Age Human Skeletons Excavated in North China*

The kneeling facet is formed on the metatarsal heads because of perpetual kneeling over a long period of time. It was observed in several sites in China. We analyzed the metatarsus of individuals of the Bronze Age from four sites in Shandong Province, China: 1) Daxinzhuang, 2) Liujiashuang, 3) Chengziya, and 4) Houzhangda. We found that the kneeling facet is ubiquitous in Bronze Age individuals. No significant difference of the frequency is observed either between the sexes or among the owner of different levels of tombs; and the kneeling facet is more obvious within advancement of aging.

Zheng, Emily [29] see Meyer, Dominique

Zhong, Hua [279] see Ma, Mitchell

Zhonghua, Xin

[333] *The Stone-Construction Tombs of Xiaguanzi in Maoxian County, and the Question of Cultural Contact throughout Western China*

Xiaguanzi site in Maoxian County, located at the junction of the upper reaches of Min and Fu Rivers, is an important node on the channels of culture transmission between North and South China. From 2014 to 2015, Neolithic remains and stone-constructed tombs were excavated. The Neolithic remains include pottery, stone and bone artifacts, leather objects, animal bones, plant seeds, house remains, tombs, and ash pits. Although there no painted pottery occurred at Xiaguanzi, the pottery found here is very similar to Neolithic finds from the upper reaches of the Min River. This is the first time that stone-constructed graves have been found in the upper reaches of the Min River. These stone-constructed graves are larger in size than the typical local stone-cist graves, and they are furthermore influenced by the Han culture. Based on stratigraphic evidence and the object types found in the graves, they can be dated between the early Western and the late Eastern Han, making them much later than previous finds in the region. The discoveries from Xiaguanzi are therefore very important for establishing the local chronology and developmental sequence of stone tombs in the Min River Valley and surrounding areas.

Zhou, Bright (Stanford University Archaeology Center)

[92] *Bioarchaeological Assemblages at Çatalhöyük: A Relational Examination of Porotic Hyperostosis and Cribra Orbitalia Etiologies and Transmissions*

Porotic hyperostosis, manifested as pittings on the outer table of the cranial vault, and cribra orbitalia, the analogous porosities that form on orbital roofs, are two commonly observed pathologies used extensively by bioarchaeologists to understand past health and nutritional conditions. Yet the etiologies of porotic hyperostosis and cribra orbitalia are largely varied and not well understood, with proposed explanations ranging from diet and nutrition to chronic and infectious diseases. This paper exists to: 1) create a novel theoretical framework to holistically examine porotic hyperostosis and cribra orbitalia etiologies, and 2) apply the theoretical model to bioarchaeological data gathered from Çatalhöyük, Turkey in order to arrive at an extended evolutionary understanding of disease transmission. I draw upon relational theories to reconsider etiologies not as distinct prongs, but as an integrated assemblage of the body, pathology, and environment. Furthermore, I show how a fuller incorporation of social and cultural behaviors into the porotic hyperostosis and cribra orbitalia etiological models helps explain the static rates of the lesions over time, despite increasing population growth. I conclude by articulating the need for archaeologists to incorporate the wide range of factors influencing inheritance so that more comprehensive models for disease ecology can be constructed.

[348] *Discussant*

Zhou, Yawei (History College, Zhengzhou University, Zhengzhou, China), Qipeng Yan (Shaanxi Normal University) and Wanfa Gu (Zhengzhou institute of cultural relics)

[115] *Health and Stress of Neolithic Yangshao Culture Skeletal Population from Wanggou Site, Zhengzhou*

The Wanggou site, located in the Lower Yellow River valley, is a large Yangshao culture cemetery, dating to 7000–5000 BP. Two hundred and eleven skeletons were examined for variations from normal morphology, including nonmetric traits, to characterized pathology of the Neolithic Age residents of Central China. This paper examined skeletal evidence of bone disease, trauma and musculo-skeletal stress markers (MSM) of ancient residents. A prevalence of spina bifida, spondylolysis, lumbarization, sacralization and septal aperture have significant gender differences. The prevalence of cribra orbitalia and porotic hyperostosis are high in infants (20%) and children (66.67%), and relatively low in adults (0.6%). The high frequency of lumbar joint disease (29.31%) may be related to long-term engagement in agricultural activities such as planting. The rate of overall skeletal trauma is 9.05%; and skull trauma is 14.29%. Females (38.55%) have higher MSM of the humerus than males (26.44%) for minimal changes, but in the higher levels of severity males have higher prevalence. Taken together these results allow us to begin to reconstruct Neolithic behavior, adaptation and lifeways in the Lower Yellow River valley during the Yangshao culture.

Zhou, Yuduan [78] see Li, Yinghua

Zhu, Hong [115] see Eng, Jacqueline

Zhu, Sihong

[33] *Interpretation of "Figure with Green Facial Expression" Unearthed in Pit No.2 in Emperor Qinshihuang's Mausoleum Site Museum*

There are various opinions about this kneeling archer which was unearthed in Pit No.2 at Emperor Qinshihuang's Mausoleum Site Museum known as the "Figure with Green Facial Expression." This paper holds a view that it should be called the "Figure with Cyan Facial Expression"; and combined with the ideological and cultural backgrounds and perception of colors, so to express the humanity and politics of Chinese color theory under the influence of Yin-Yang and Five-element thoughts. Seen from the original meaning of "cyan," it gives warriors a sense of youthful vigor. Analyzed from the point of color psychology, "cyan" means humanistic property which shows the inner personality of warriors, such as loyalty, education and cautiousness. In addition, the "figure with cyan facial expression" is a reflection of color diversity used in the art fabrication of terracotta warriors.

Zhu, Xiaoting (Nanjing Museum, Nanjing, Jiangsu, China), Hong Zhu (Research Centre for Chinese Frontier Archaeology), Hua Zhang (Department of Archaeology, Simon Fraser University), Dongya Yang (Department of Archaeology, Simon Fraser University) and Minghui Wang (IA CASS)

[115] *Preliminary Investigation of Health and Stress in a Human Skeletal Population of Liangzhu Culture from Jiangzhuang Site, Xinghua, Jiangsu*
This present study investigates human skeletal remains (N = 108) of Jiangzhuang site from Xinghua, Jiangsu, China. Jiangzhuang, dated to the Liangzhu Culture (ca. 3400–2250 BC), provides a unique opportunity to explore the stress and lifeways of ancient people from the Neolithic rice agricultural community in East China, since the preservation of human remains is very rare due to the acidic soils of the region. Multiple skeletal indicators of stress were examined including oral pathologies, nonspecific indicators of nutritional and physiological disturbance (cribra orbitalia, linear enamel hypoplasia, osteoperiostitis, and activity-related osseous manifestations (osteoarthritis and enthesal changes). In conjunction with other lines of bioarchaeological evidence (stable isotopic and a DNA analyses), our results suggest that health was adversely affected in several ways, particularly considering the robust enthesal markers indicating a heavy workload. However, dental health was relatively good overall testifying the low-starch rice agriculture. This study adds to our growing understanding of the ways in which the transition to a rice agriculture changed stress exposure and lifeways of the people of Jiangzhuang in Neolithic East China.

Zhuang, Yijie [78] see Lian, Huiru

Zhuravlev, Denis [221] see Schlotzhauer, Udo

Ziegler, Michael [87] see Warren, Shannon

Ziegler, Michael (George Washington University), Shannon Warren (Colorado State University), Ssebuyungu Christopher (Makerere University), Silindokuhle Mavuso (University of the Witwatersrand) and Kathryn L. Ranhorn (George Washington University)

[153] *Site Formation Analysis of Middle Stone Age Locality GaJ17 in the Koobi Fora Formation, Northern Kenya*
The Koobi Fora Formation (KF Fm.) of the Turkana Basin in Kenya is comprised of a Plio-Pleistocene sedimentary sequence that has produced unprecedented paleoanthropological discoveries. Previous work in the KF Fm. reported an archaeological locality, GaJ17, exhibiting in situ Middle Stone Age (MSA) material eroding from an indurated sandstone. Understanding the depositional context of this locality required further geologic study as few MSA localities are represented in the KF Fm. This is due to the extensive unconformity between the youngest Mbr. of the KF Fm., (Chari Mbr. <1.39 Ma) and the overlying Galana Boi Fm. (<10 ka). Renewed excavations at GaJ17 allowed for sedimentary facies analyses, revealing associated aeolian and fluvial lithofacies. We further evaluate the depositional history of the archaeological horizon using standard fabric analysis of archaeological materials. Geochronological studies were also conducted (e.g., optically stimulated luminescence (OSL) and radiocarbon). Performing the geochemical (XRF) identification of a tuff that underlies the archaeological horizon provides further geochronological control. Mineralogical and petrographic studies of the surrounding sediments provide an understanding of the depositional context and sediment provenance. This research was supported by the NSF International Research Experience for Students (OISE 1358178 and 1358200).

Ziesemer, Kirsten (Leiden University), Allison E. Mann (Max Planck Institute for the Science of Human Hist), Bernd W. Brandt (Academic Centre for Dentistry Amsterdam, Amsterdam), Corinne L. Hofman (Leiden University) and Christina Warinner (Max Planck Institute for the Science of Human Hist)

[69] *New Approaches to Study Health and Disease in the Precolonial Circum-Caribbean*
The most frequent pathologies found throughout the circum-Caribbean before arrival of the Europeans are dental and periodontal diseases. To date, ancient oral health has been studied using a variety of techniques, and recently ancient DNA (aDNA) analysis of dental calculus (calcified plaque) has shown great promise in revealing not only (oral) health and disease, but also diet and the composition of the oral microbiome over archaeological timescales. In this paper, we present ancient metagenomic data generated from human dental calculus from multiple archaeological sites in the circum-Caribbean. We compare the phylogenetic and taxonomic composition of precolonial oral microbiomes to modern dental calculus samples and find that the microbial composition of the precolonial Caribbean oral microbiome is similar to that of present-day populations. Our findings also shed light on the oral health and disease of indigenous communities before European contact.

Ziesemer, Kirsten [86] see Mann, Allison E.

Zilhão, João [169] see Real Margalef, Cristina

Zimmerman, Andrew [229] see Eusebio, Michelle

Zimmerman, Larry (IUPUI/Eiteljorg Museum)

[318] *Discussant*

Zimmermann, Mario (Washington State University)

[177] *Maya Peasantry: Crop Diversity Past and Present*
For several years, peasant communities on the Yucatán Peninsula, Mexico, have not produced high enough maize-yields to sustain populations in the area. This is despite the fact that modern-day demographics are considerably lower than population estimates for the heights of Maya cultural development during the precolumbian era. Some scholars have argued that maize was not the sole staple for the ancient Maya. Root and tree crops are among the candidates for alternative staples given their productive potential and adaptation to the tropical conditions of the Yucatán Peninsula. A review of ethnographic as well as archaeological and ethnohistoric sources regarding Maya dietary patterns provides a picture of inconsistencies and temporal dissociations. On the other hand, recent advances in paleoethnobotany promise to provide more direct clues on alternative crops that had been successfully cultivated in the past. A better understanding of the role of maize within ancient Maya diet would allow us inform present day policies and decision-making processes. I argue that the archaeological record can contribute to the knowledge upon which a dialogue between scholars, politicians, and Maya farmers will be found to improve the living-conditions of the latter and increase the level of dietary auto-sufficiency in the area.

[349] *Discussant*

[349] *Chair*

Zimmermann, Mario [5] see Fernandez Souza, Lilia

Zinsious, Brandon (University of Louisville) and Jonathan Haws (University of Louisville)

[165] *Lapa do Picareiro and the Gravettian-Solutrean Transition: Refining the Chronology of the Solutrean Techno-Complex in Western Iberia*
The Solutrean techno-complex, traditionally divided into three broad temporal phases, has been an area of great interest for those studying human adaptations during the Upper Paleolithic, specifically the Last Glacial Maximum. Distinguishing more discrete phases of the Solutrean period is hampered by the lack of adequate radiocarbon dates from secured contexts. Currently, Solutrean stratigraphic information relies mostly on older excavations that produced lower resolution data. This paper presents new radiocarbon dates associated with Terminal Gravettian and Lower Solutrean archaeological contexts at the site of Lapa do Picareiro, in central Portugal. Using fine spatial recording methods and a complete series of carbon dates for lithic-bearing stratigraphy spanning the entire Solutrean sequence, new information is presented for the discussion on phases outside of the three-part chronology currently used to divided the Solutrean techno-complex. This Gravettian-Solutrean transitional phase, or what may be referred to as the Proto-Solutrean, is a main focus of this ongoing project. This paper will consider the broader implications of these new datasets on improving our understanding of Human adaption during the LGM and long distance contact between Iberian populations, helping archaeologists to better define the Solutrean in terms of its temporal and archaeological contexts.

Zipkin, Andrew [146] see Thompson, Jessica

Zori, Colleen

[323] *Multi-Scalar Analysis of Copper and Silver Production under the Inka: A Case Study from Northern Chile*
Andean prehistory witnessed the development of numerous regional metallurgical traditions that were harnessed and significantly restructured as the Inka empire (AD 1400–1532) expanded along western South America. Taking the Tarapacá Valley of northern Chile as a case study, I analyze how imperial incorporation altered the production of copper and silver across multiple spatial scales. I begin at the regional level, analyzing how the procurement and transport particularly of silver-bearing ores was undertaken by the empire. Specifically, the technical and logistical difficulties presented by local silver mines demanded a degree of coordination virtually impossible without the organizational capabilities of the Inka state. I then present data related to valley-level changes, focusing on how Inka incorporation altered the spatial distribution of smelting sites in the Tarapacá Valley. These data indicate that metallurgical activities became increasingly concentrated at Tarapacá Viejo, the imperial administrative center. Finally, I take a site-level approach to the organization of copper and silver refining, documenting the physical and social segmentation of the production process. This study provides important insights into the impacts of imperial incorporation on metal production, focusing on how interconnected changes occurred at scales from the regional to across a single site.

Zori, Colleen [164] see Schultze, Carol

Zubrow, Ezra B.W. [90] see Ruhl, Erika

Zúñiga Arellano, Belem (Proyecto Templo Mayor) and Adrian Velazquez-Castro (Museo del Templo Mayor-INAH)

[225] *The Anahuatl Pectorals from the Offerings of the Great Temple of Tenochtitlan*
The anahuatl pectoral is one of the shell ornaments that have been found in the offerings of the great temple of Tenochtitlan. In paintings and sculptures, it is worn by Tezcatlipoca and deities that are stars and warriors, as Tlahuizcalpantecuhtli and Mixcoatl. Inside the offerings, the anahuatl are associated to items related to the underworld, sacrifice and war. This has led to propose that these pectorals represented the stars, which were the warriors during the night. The presence of the anahuatl pectorals in the tenochca offerings dates back to constructive stage IVb (AD 1469–1489), when a tenochca style of manufacturing shell objects is created. By this time, these pieces were always made of *Pinctada mazatlanica* shells, which were abraded with basalt stone and cut and decorated with obsidian tools. Nevertheless, in offerings excavated recently that correspond to constructive stage VI (AD 1489–1502), anahuatl pectorals have been found made with different tools and even of fresh water mussels. In this paper some possible explanations to these changes are presented.

Zúñiga Arellano, Belem [225] see Gaytán-Caballero, Adriana

Zúñiga Arellano, Belem [225] see López Luján, Leonardo

Zurro, Debora (CaSEs. Department Archaeology & Anthropology. IMF-CSIC)

[274] *Chair*

Zutter, Cynthia (MacEwan University)

[291] *Discussant*

Zwyns, Nicolas (University of California-Davis), Damien Flas (TRACES-UMR 5608, Université de Toulouse), Aurora Allshouse (University of California-Davis), Johua Noyer (University of California-Davis) and Kevin Smith (University of California-Davis)

[389] *The Initial Upper Paleolithic of Northern Mongolia: Site Function, Mobility, and Assemblage Plasticity*
In the broadest sense, the term Initial Upper Paleolithic refers to archaeological assemblages that, without being necessarily 'transitional,' combine retained Middle Paleolithic and derived Upper Paleolithic features. Here, we present an assemblage that documents such a phenomenon at the site of Tolbor 16, northern Mongolia. Although we suggest that the layer 7b can be assigned to the northeast Asian variant of the IUP, a detailed analysis and the use of a narrow definition highlights some aspects of the technical systems as being subject to functional plasticity. For example, measured frequencies of MP tool types and blade blanks may not exclusively represent an evolutionary stage, but also reflect patterns of recycling and export. With a lack of well-preserved fauna, the lithic assemblage could then be used as a proxy to address issues of preservation bias, spatial distribution and site function. By comparing our results with other examples from the Tolbor Valley and from Siberia, we discuss how settlement patterns influence our

understanding of the IUP phenomenon and its evolution. Our observations suggest that, while plasticity may affect our ability to recognize IUP, the technological structure of lithic assemblages remains surprisingly consistent.

Zwyns, Nicolas [113] see Peng, Fei

Zych, Thomas (University of Toledo) and Brian Nicholss (University of Wisconsin-Milwaukee)

[341] *Sculpting a Mississippian Aztalan: A Landscape Perspective*

The culmination of over a century of research at the Aztalan site in south-central Wisconsin has highlighted the drastic extent of landscape modification by the site's inhabitants. Notably, with the arrival of Middle Mississippians by the end of the eleventh century AD these modifications included construction of earthen platform mounds, formal plazas, and landscape reclamation. Utilizing publicly available lidar derived surface data for Jefferson County, Wisconsin, this poster presents a summary of the terrain and morphometric analyses of the site and its surrounding environs. The analysis of the landscape along the Crawfish River Valley adjacent to the site aims to further underscore the scale of landscape modifications associated with the socioreligious practices of Middle Mississippian populations in the Eastern Woodlands.