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REACHING AND TEACHING

The masthead of this issue includes the new logo for the Society for Archaeological Sciences. The combination of the iconic pointed masonry trowel with the equally recognizable Rutherford atomic model clearly illustrates the dual constituencies of this organization. It has been suggested, however, that our membership may not reflect as accurately the combination of fields. While this newsletter is sent to both laboratory personnel and those excavating in the field this summer, there are probably a lot more researchers on the practicing archaeology side of the equation that have not joined the Society or may not even be aware of its existence. Tell your colleagues and collaborators about SAS. Share the Bulletin and web address. Give us a hand in increasing membership by reaching out your hand to those you think could be interested. This is particularly true with regards any students or research fellows with whom you interact. Talk to them about the importance of access and networking provided by professional organizations.

There are a few students already in SAS, and these young scholars are certainly representing us well. As an example of the excellent quality of research currently conducted by students, there were several worthy entries at the Society for American Archaeology conference in St. Louis, MO

this past April for the prestigious R.E. Taylor Award Student Poster Award. The students were judged on the significance of the archaeological problem they were attempting to answer, the appropriateness of the methods used, soundness of their conclusions, the appearance of the poster display, and the oral presentation of the poster. Faced with a plethora of great posters, the selection committee decided to award two prizes. The winners are Dana Rosenstein (with J. Feathers) for her poster on “Luminescence Dating of Samples from Recent Contexts in South Africa” and Elizabeth Sonnenburg (with J. Boyce, E. Reinhardt and A. Cannon) on her research concerning “Paleoenvironmental Reconstruction and Water-Level Fluctuations: Implications for Understanding of Paleoindian and Archaic Archaeology in Southern Ontario.”

Take a look at the rest of this issue to see some of the other noteworthy work done by present (and potentially future) members of this organization. An essay by Gordon Rakita speaks to the issue of teaching evolution and science while under fire. The book review is contributed by a recent BA in Anthropology. If you are regularly talking with students, you will see they have a lot to offer.

Jay VanderVeen, editor



Students in a Forensic Anthropology course at Indiana University South Bend examine a buried pig for various signs of advanced decomposition.

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ANNOUNCEMENTS

Associate Editors sought for the SAS Bulletin. Consider joining the editorial staff of this newsletter by volunteering your services as either a Book Review or Archaeological Chemistry Associate Editor. The positions are not onerous ones, and they would facilitate your interaction with many people in the respective fields. Applicants can be at any stage of their academic or professional careers, from graduate student to full professor or laboratory director. For more information or to offer your name (or the name of a potential applicant), please contact Jay VanderVeen (jmvander@iusb.edu).

The Center for American Archeology 2010 **Weekend Workshop in Geoarchaeology** is scheduled for August 14-15. Tuition for the workshop is \$200, including room and basic field lunches (breakfast and dinner are not included). Rooms are often available on the days immediately before and after workshop dates at no additional charge. For details please visit: http://projectpast.org/gvogel/geoarch_wrkshop/geoarch.html

The US National Park Service's 2010 **Workshop on Archaeological Prospection Techniques** entitled "Current Archaeological Prospection Advances for Non-Destructive Investigations in the 21st Century" will be held May 24-28, 2010, at the Knife River Indian Villages National Historic Site near Stanton, North Dakota. For further information, please contact Steven L. DeVore, Archeologist, National Park Service, Midwest Archeological Center, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska 68508-3873; tel: (402) 437-5392, ext. 141; fax: (402) 437-5098; email: steve_de_vore@nps.gov.

The US National Park Service is also offering **online courses for training archaeologists in interpreting prehistoric** and historic sites to the public. For more information, contact Teresa Moyer at Teresa_moyer@nps.gov or visit <http://doilearn.doi.gov/coursecatalog/index.cfm>.

CHEMICAL INVESTIGATIONS OF PIGMENTS AT CORIGLIA, CASTEL VISCARDO USING PORTABLE X-RAY FLUORESCENCE SPECTROMETRY AND PORTABLE RAMAN SPECTROSCOPY

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Introduction

The excavation at Coriglia, Castel Viscardo, located approximately 8 km northwest of Orvieto, Italy, is of a multi-phased site beginning in the 8th century BCE as an Etruscan settlement and, with no interruptions, ends with a Late Antique

phase. Excavations since 2006 have uncovered a number of structures of Etruscan, Roman Republican, Imperial and late Antique date. Considerable quantities of Etruscan and Roman pottery, fourth-style fresco, lead pipes, and numismatic evidence from the middle of the second century BCE to the fourth century CE have been found. Products are both local as well as imported. The initial interpretation of the site was that it was an Etruscan settlement that, after the Roman conquest of Orvieto developed into a Roman villa. The finds are, however, incongruous with this hypothesis. Our current working hypothesis is that Coriglia begins life as an Etruscan healing shrine around which a small town develops then grows. This in turn grows into a somewhat larger town with a bath complex/shrine along the Via Cassia during the late Republic that remains in use as such until at least the 5th century CE.

Two portable instruments were utilized at the site during the summer 2009 excavation season, a portable x-ray fluorescence (XRF) spectrometer for elemental characterization of materials and a portable raman spectrometer for molecular characterization. The portable XRF spectrometer had been used successfully to characterize mortars and hydraulic cements during the previous season (Donais, Duncan et al. in press). The complimentary chemical information provided by these instruments is especially suited for the identification of pigments (Comodi, Bernardi et al. 2004; Ricci, Borgia et al. 2004; Desnica, Skaric et al. 2008). The portable designs of both instruments allowed us to easily and quickly collect data on collected and stored artifacts from our site, and on museum pieces that had never been chemically characterized. Identification of pigments on artifacts can help in identifying age of finds and trade partners based on the availability of the minerals used to produce the pigments. The following examples illustrate some of our findings.

Instrumentation

An Innov-X Systems (Woburn, MA) Alpha Series portable XRF spectrometer was used for the elemental analyses. The analyzer has a Ag anode x-ray tube excitation source, a spot size of approximately 170 square millimeters, and a Si Pin diode detector. Power is provided by rechargeable Li-ion batteries with one battery providing approximately four hours of operation. A Hewlett Packard iPAQ personal digital assistant was used for instrument operation and data storage. All data were exported in spreadsheet form from the iPAQ to a laptop computer at the end of each day for evaluation. The instrument was operated in "Soil" mode with a 40 kV excitation and a Compton Normalization algorithm (Mantler, Willis et al. 2006). Fluorescence signal was collected for thirty seconds for all analyses on artifacts with three to five repeat analyses for each pigment on a sample. Our protocols for the treatment of fresco fragments are to leave the fragments in the condition they are when taken *ex situ*. Thus elements of the soil matrix sometimes remain attached. Note that the XRF spectrometric data will not be provided as quantitative information in this paper but will instead be reported as elements found at "significant" and "trace" levels. This is due to the XRF spectrometer providing data for the combined surface pigments and underlying fabric; analyses of the fabric

from the side and/or back of the fragments allows differentiation between it and the pigments and thus determination of elements only in the pigments.

Raman spectra were measured with an Enwave Optronics (Irvine, CA) EZRaman-I-A2 high sensitivity field portable Raman system. The laser source was an Enwave Optronics frequency stabilized 785 nm diode laser system that was limited to less than 100 mW output (standard is 300 mW) in order to protect samples from burning. The optical system is an Enwave Optronics high sensitivity cooled CCD spectrograph with a spectral range of 250 to 2100 cm^{-1} with optical resolution of 4.5 cm^{-1} . The laser light and the return signal are carried over a 1 meter armored fiber optic from the main unit to a hand held probe, which contains focusing optics and a OD >8 filter for Rayleigh scattering rejection. The probe tip is interchangeable and for most samples a 7 mm focusing distance was used, permitting Raman spectra without sample contact. The system runs on AC power or with a rechargeable lithium battery. Data acquisition and instrument operation is managed with a built in Comact PC using Enwave Optics EZRaman Reader software. For comparison of spectra, CrystalSleuth software (Downs 2006) was used.

Red Pigments

Numerous red fresco fragments, an example of which is shown in Figure 1, were found in Trench C and could be related. XRF spectrometric analyses on five fresco fragments with red pigment on the surface showed high levels of sulfur and mercury with trace amounts of lead, zinc and a few other elements. The XRF spectrometry data leads one to surmise that the red fresco pieces were painted with vermilion, a red pigment derived from the mineral cinnabar (HgS) (Baraldi, Baraldi et al. 2007; Desnica, Skaric et al. 2008).



Figure 1: Sample 07C338

Raman spectra for two red fresco fragments and pure vermilion are shown in Figure 2. Note the distinctive raman signature for vermilion in the 250 to 450 cm^{-1} wavenumber shift region. The broad peak from 450 to 2140 cm^{-1} wavenumber shift is due to fluorescence background.

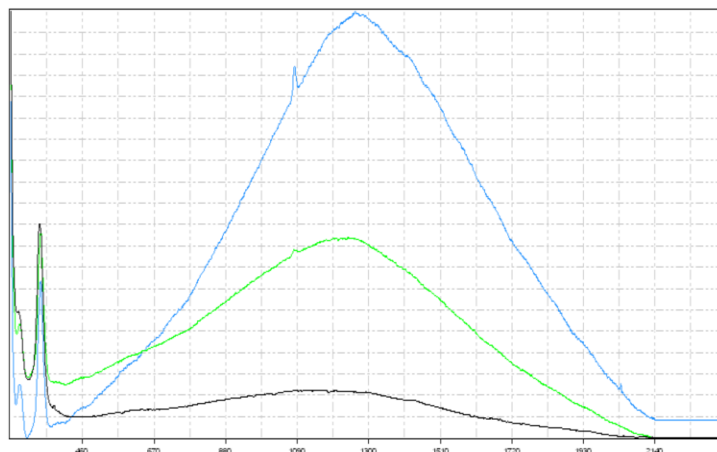


Figure 2: Raman spectra of three red pigments. The light blue (center top) and green traces (center middle) show data for red pigments on fresco fragments and the black trace (center bottom) shows data for pure vermilion.

Green and Turquoise Pigments

A turquoise-white-purple multi-colored fresco fragment found in Trench C in 2006 is shown in Figure 3. XRF spectrometric analysis of this and other green and blue-green pigments found in Trench C indicate significant levels of iron and an elevated but lower level of copper (about ten-fold lower than the iron). Raman analysis of these samples as shown in Figure 4 confirms identification of the pigment as green earth or terre verte, a mixture of celadonite and glauconite ($\text{K}(\text{Mg}, \text{Fe}^{2+})(\text{Fe}^{3+}, \text{Al})\text{Si}_4\text{O}_{10}(\text{OH})_2$) noted by the signal at 396 cm^{-1} (Baraldi, Baraldi et al. 2007; Calza, Anjos et al. 2007). The copper present in these samples is most likely as a secondary mineral mixed with the terre verte to change the coloring to its blue-green hue. Glauconite was not identified by raman analysis, however.



Figure 3: Sample 06C499

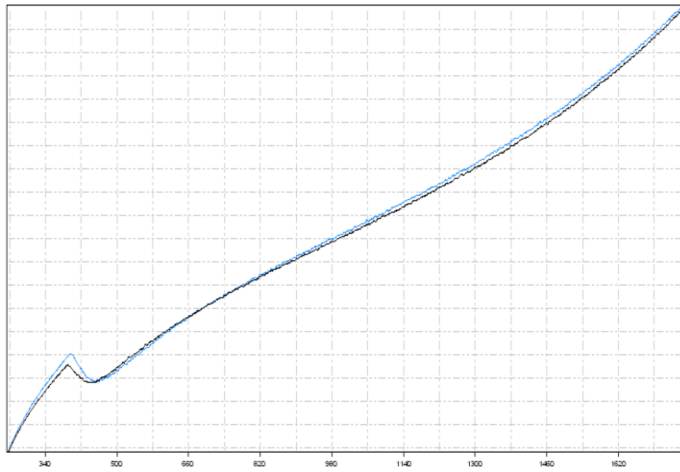


Figure 4: Raman spectra of the green pigment in sample 06C499 (black trace) and pure celadonite (lighter or blue trace).

Purple and Red Pigments

A number of fresco fragments with purple pigments have been found in Trench C including the sample in Figure 3 and the samples in Figure 5a and 5b. These and other fresco pieces with purple pigment showed significant levels of iron by XRF spectrometric analysis. Raman spectra of the samples are shown in Figure 6. The characteristic peaks at 284 cm^{-1} , 404 cm^{-1} , 494 cm^{-1} , and 607 cm^{-1} are indicative of the pigment hematite, hydrated Fe_2O_3 (Baraldi, Baraldi et al. 2007). This pigment appears more purple in hue in its alpha form and more red in hue in its beta form. Analysis of a decorative museum piece with red pigment on its lips also revealed the presence of hematite appearing visually to be the more red beta form. This piece and the raman spectrum of the red pigment are shown in Figure 6a-c. A non-contact probe was used to collect this raman spectrum shown from 7 mm above the surface. Although the spectrum is dominated by fluorescence, a close up of the region below 450 cm^{-1} shows clearly identifiable hematite peaks. Both purple and red hematite have been previously identified on Roman wall paintings (Mazzocchin, Agnoli et al. 2003).



Figure 5a: Sample 116p



Figure 5b: Sample 116f

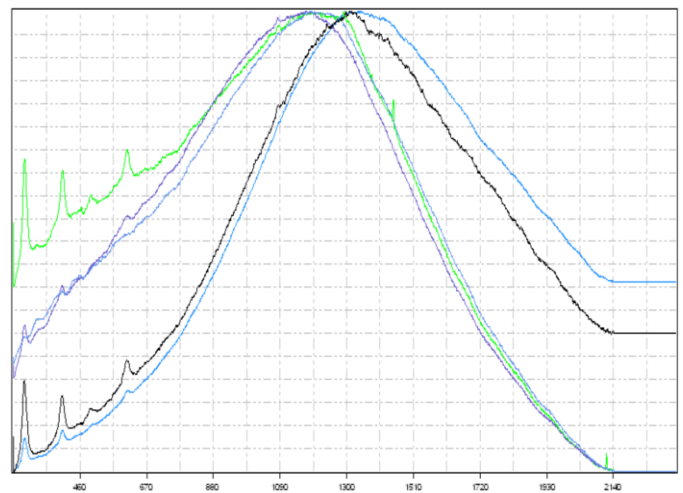


Figure 6a: Raman spectra of five purple pigments. All traces are for fresco fragments.



Figure 6b: Piece from the Etruscan Museum

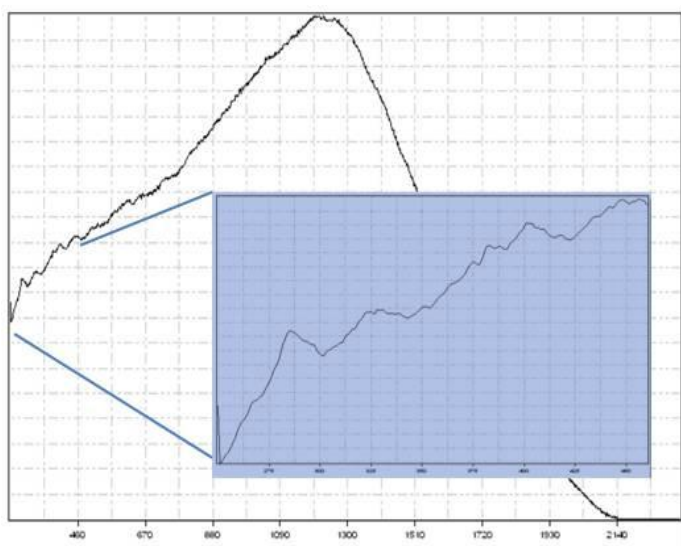


Figure 6c: Original spectrum and close up region taken from non-contact measurement of piece in Figure 6b.

Conclusions

As demonstrated by the examples discussed, portable raman and x-ray spectrometries can be valuable tools for characterization of pigments of archaeological significance. We plan to expand our raman spectral library and XRF spectrometry data sets for additional pigments during the 2010 season.

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SOURCING OF OBSIDIAN FROM THE ANCIENT MAYA FARMING COMMUNITY OF CHAN, BELIZE USING PORTABLE-XRF

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Introduction

This study focused on determining the elemental composition, and thus source origin, of the obsidian artifact assemblage from the ancient Maya agrarian community of Chan, located in west-central Belize (Figure 1). The Chan site is situated within the undulating limestone uplands between the Mopan and Macal Rivers in the upper Belize River Valley. The community comprises households and associated agricultural terraces surrounding a small ceremonial plaza group that featured an E-Group temple complex and a single vaulted masonry range structure. The extreme longevity of settlement at Chan (roughly 800 B.C.-1200 A.D.) allows us to examine the impacts socio-political/economic changes that effected the Belize Valley, such as the rapid florescence and decline of the regional polity capital Xunantunich, may have had on the maintenance of exchange networks that supplied smaller settlements with obsidian.

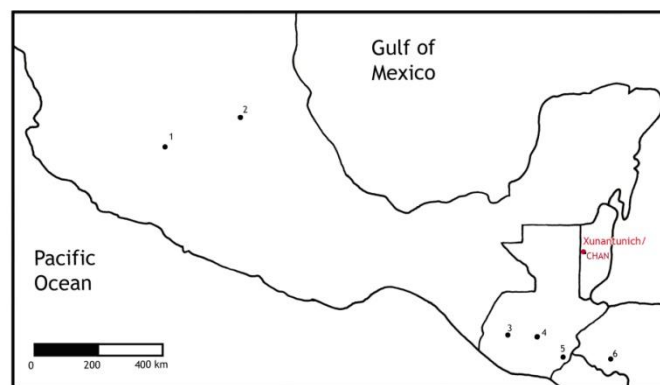


Figure 1. Map of Mesoamerica showing obsidian sources identified at Chan; 1) Zinapécuaro, 2) Pachuca, 3) San Martín Jilotepeque, 4) El Chayal, 5) Ixtepeque, 6) La Esperanza. (From Glasscock 2002.)

Additionally, this project assessed the efficacy of portable XRF instrumentation for identifying Mesoamerican obsidian sources, demonstrating the promise of p-XRF as a rapid, low-cost, portable method of characterizing obsidian. Survey at Chan began in 2002, directed by Cynthia Robin (Northwestern

University), and was followed with seven field seasons of excavation and laboratory analysis at Chan's ceremonial/civic core and leading family residences, as well as locations in Chan's settlement area including agricultural terraces, a lithic workshop, limestone quarries, and their associated house mounds. 742 obsidian artifacts were recovered at Chan, and the use of p-XRF allowed for a 100% sample to be analyzed.

Method

Analysis was conducted at the Field Museum Elemental Analysis Facility (EAF) using an Innov-X Systems Alpha™ portable X-ray fluorescence device. X-rays are produced using a tungsten target, and are collected by a Si PIN diode detector, with an energy resolution of less than 230 eV FWHM at the 5.95 keV Mn K α line. In the present study, the fundamental parameters program supplied by Innov-X Systems™ was used to calculate concentrations, with the instrument set to “soils” mode, which utilizes a 40keV beam voltage and 20 μ A current to excite specimens. Data were collected for a total of 60 seconds per analysis, with three analyses performed per archaeological specimen and averaged.

Eight elements were present at high enough concentrations in most specimens to be measured—titanium, manganese, iron, zinc, rubidium, strontium, zircon, and niobium. Instrument performance was evaluated by running well characterized pieces of Sierra de Pachuca and Glass Buttes obsidian (Glascok 1999) along with batches of archaeological specimens. The Innov-X Systems™ software produces an inaccurate calculation of titanium concentrations in obsidian, and these were consequently omitted from analysis. Manganese and iron were utilized only as a ratio to each other, as absolute concentrations proved difficult to reconcile with published data for the Pachuca and Glass Buttes samples. The remaining elements measured with high accuracy in the standards and were utilized as parts per million concentration values for analysis. Precision is on the order of 5-10% for all elements included in the present study.

Results

Six distinct compositional groups were identified among the archaeological specimens, labeled groups one through six, as can be seen on a bivariate plot of Sr/Zr and Mn/Fe ratios (Figure 1). Groups 1 (N=263), 2 (N=102), and 3 (N=373) contain all but four of the analyzed specimens, and comparison of these to XRF data obtained from Northwest Research Obsidian Laboratories (www.obsidianlab.com) for the three primary Guatemalan sources utilized by the Maya confirms the archaeological specimens in groups 1-3 as originating at the Ixtepeque, San Martin Jilotepeque, and El Chayal obsidian sources respectively.

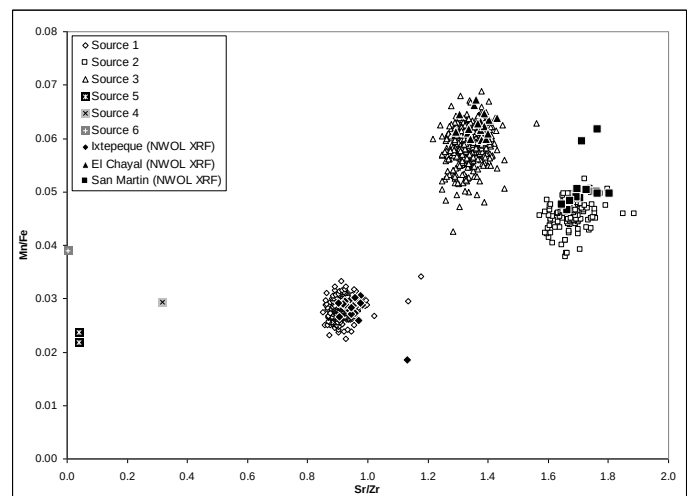


Figure 2. Obsidian sources identified at Chan, Belize.

The remaining three chemical groups were then compared to Instrumental Neutron Activation Analysis data for other Central American obsidian sources collected at Missouri University Research Reactor (Cobean et al. 1991, Glascok 2002, Glascok et al. 1990, Glascok, Braswell, and Cobean 1998), as well as raw material samples from the Sierra de Pachuca source collected by XRF at the EAF (Figure 3). On present evidence, the single piece of obsidian comprising group 4 is most similar to published data for the La Esperanza source in Honduras. The two specimens included in group 5 are similar compositionally to the Zinapecuaro source in Michoacan, Mexico. The single piece of group 6 obsidian is a chemical match for the source samples analyzed from the Sierra de Pachuca source in the Valley of Mexico; its greenish coloration and high zircon and zinc concentrations characteristic of peralkaline obsidians leave little room for doubt that this piece derived from the Pachuca source.

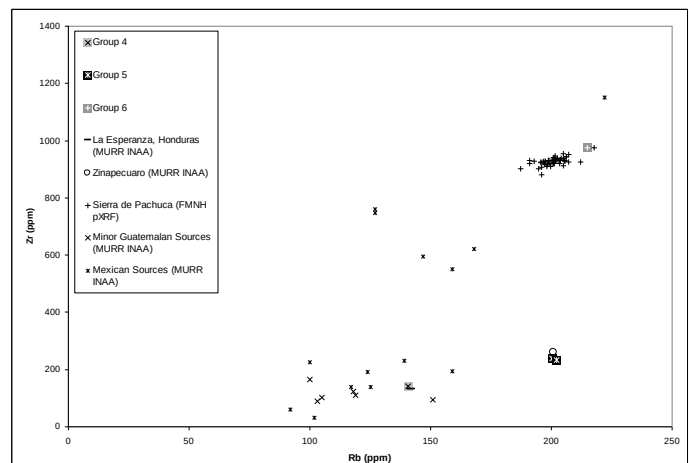


Figure 3. Groups 4, 5, and 6 compared to additional Guatemalan, Mexican, and Honduran obsidian sources.

Discussion

The temporal distribution of raw material sources utilized in obsidian artifacts at Chan reflects a trend that has been previously observed and reported by several scholars in the

Southern Maya Lowlands (Brown et al 2004, Nelson et al 1978). At Chan, San Martín Jilotepeque obsidian is found in greater concentrations in the Preclassic with a steady decline up and through the Postclassic. The Ixtepeque source rises in frequency during the Preclassic to heavily dominate the Early Classic and then be abruptly replaced in importance by El Chayal obsidian in the early Late Classic, which remains the most abundant material at Chan until its abandonment. Non-Guatemalan sources appear only very late at Chan, and are not present in Postclassic deposits (Figure 3).

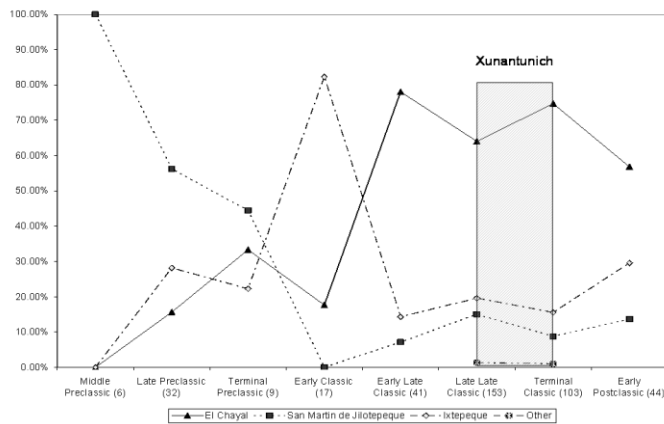


Figure 4. 3 Temporal Distribution, N=405; (disturbed lots, non-datable lots, humus lots, and a retouch episode (in Early Classic N=114) not included).

The socio-political reasons for these fluctuations, especially in regards to regional acquisition in the Belize Valley, are beyond the scope of this report (see Hammond 1972). However, we were especially interested in the possible influence on obsidian acquisition at Chan the polity capital Xunantunich may have exerted during its sudden rise in the late Late Classic. One interesting observance is that all non-Guatemalan samples are found in deposits contemporaneous to the tenure of Xunantunich. However, also of note is the conspicuous deviation from the expected Southern Lowland pattern after Xunantunich's abandonment, in that Ixtepeque obsidian never reemerges in the Terminal Classic/Postclassic as a dominate source at Chan, as recently observed in the Central Peten (Cecil et al. 2007). The prevalence of El Chayal in Terminal Classic and Postclassic deposits is also reported at other sites, (such as Colha (Brown et al 2007), and Siebal (Nelson et al 1978)), suggesting broad regional differences in supply networks in the Guatemalan Highlands during these tumultuous times.

An additional advantage of p-XRF, with its ability to easily analyze a 100% sample of artifact assemblages, is the ability to further analyze source distribution/acquisition within discrete social contexts of a site. At Chan, the pattern of source acquisition in distinct social contexts (ex. residential (both leading family and commoner), ceremonial, core vs. settlement area...) remained consistent with the overall site, and therefore greater Mesoamerican trend (see above). Thus no one area or socio-economic/political context was receiving a preferred source of material. An example is illustrated in Figures 5 and 6, which compares the similar distribution of raw material sources over time between Chan's commoner and leading

family residences. An interesting exception is the non-Guatemalan obsidian (N=4), which was found exclusively in the site core. Three non-Guatemalan samples were deposited in the ancillary structures associated with the leading family residence on the north side of the main plaza, while a fourth sample (from the Pachuca source) was located (unfortunately in a looters trench) in a small nearby structure on the western plaza.

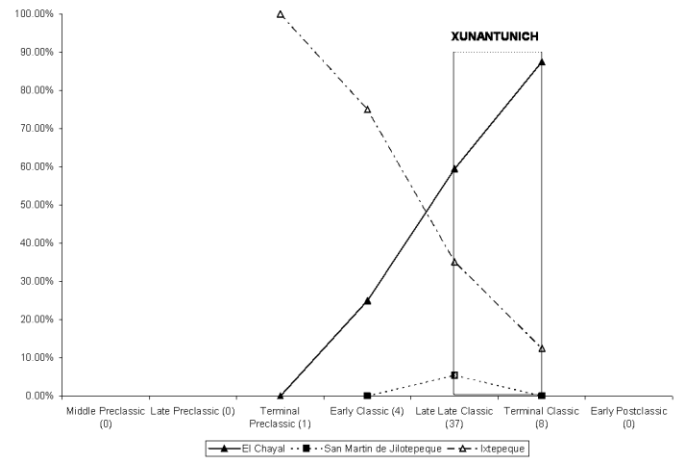


Figure 5. Commoner Households N=50.

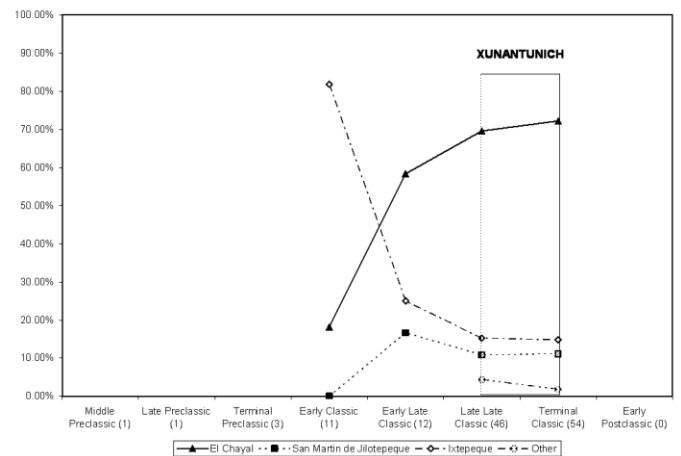


Figure 6. Leading Family Residences N=128.

Acknowledgements

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ARCHAEOLOGICAL CERAMICS

Charles C. Kolb, Associate Editor

The column in this issue includes five topics: 1) Reviews of Books on Archaeological Ceramics; 2) On-line Publication, 3) New Peer-reviewed Journal, 4) Previous Meetings, 5) Forthcoming Meetings; and 6) Exhibition.

Book Reviews

Ancient Maya Ceramic Economy in the Belize River Valley Region: Petrographic Analyses by Kay S. Sunahara. British Archaeological Reports International Series 2018. Oxford: Archaeopress, 2009. viii + 88 pp., 36 figures, 16 tables, 2 appendices; ISBN-13: 978-1-4073-0593-6, ISBN-10: 1-4073-0593-X, \$70.00 (paper). The focus of this research report, which is derived from Sunahara's doctoral dissertation (Department of Anthropology, McMaster University, Hamilton,

Ontario, Canada), is Maya ceramic economy in the region of the Belize River Valley during the Late to Terminal Classic period (800-900 CE). Methodologically, ceramic thin section petrology, raw material sourcing, and contextual archaeological analyses were employed. She used intersite comparisons of distributional patterning to examine issues of scale of production, integration, and the ceramic economy and she employed various economic models to examine potential means of the distributional patterns she observed. The volume includes seven chapters, beginning with "Research Objectives" (pp. 1-4) in which she provides an introduction to prior research, ceramic petrology, potential contributions, and chapter overviews. The second chapter, "Models for Ancient Maya Economies" (pp. 5-8) conveys basic information on economic organization, market economies, a discussion of local and external factors of scale, research issues, and her research design. Chapter 3, "Research Methodology" (pp. 9-24) contains general information about the Belize River Valley region, the eight sites selected for this study, and sampling procedures. Valuable contextual information and a list of samples are included.

Sherd samples provided by the original excavators were selected from eight sites and the author selected 225 specimens for thin-sectioning. Those providing sherd specimens included Wendy Ashmore, Jamie Awe, Anabel Ford, James Garber, Paul Healey, and Richard Leventhal. I have created table (below) which synthesizes information Sunahara provides (pp. 10-24). The initial number designates the number of thin-sectioned sherds while the second indicated the number of specimens available for selection, e.g., 11/33 (11 thin sectioned from 33 sherds provided). In some cases the entire collection was processed; however, the criteria for selection are not always clear. Three general categories were assessed: unslipped, monochrome, and polychrome. The preparation and analysis of the thin sections was undertaken in the Ceramic Petrology Laboratory, Royal Ontario Museum, Toronto. The sherd specimen designations follow the type-variety classification technique published in 1976 by J. C. Gifford in *Prehistoric Pottery Analysis and the Ceramics of Barton Ramie in the Belize Valley* (Memoir 18, Cambridge, MA: Peabody Museum, Harvard University).

Site Name	Unslipped Specimens	Monochrome Specimens	Polychrome Specimens	Totals
Cahal Pech	11/33	16/40	1/2	28/75
Pacbitun	5/15	8/20	2/3	15/38
Baking Pot	29/43	31/67	2/5	62/115
El Pilar	18/18	26/26	0/0	44/44
Xunantunich	5/12	19/32	4/8	28/52
Blackman Eddy	6/6	10/10	1/1	17/17
Floral Park	4/4	8/8	3/3	15/15
Ontario Village	5/5	11/11	0/0	16/16
Totals	83/136	129/214	13/22	225/372

In Chapter 4, "Analytical Methods" (pp. 25-36), Sunahara characterizes ceramic petrology, provenance and related issues, textural analysis, methodological concerns, the analysis, and raw materials sourcing. The 11 primary categories of mineral inclusions observed were: micritic and crystalline calcite; quartz; plagioclase, microcline, and orthoclase feldspars; volcanic ash/glass; shell; biotite and muscovite micas; chert; magnetite; and hematite. She also consulted the last local

potter, David Mangaña, of Succotz, Cayo District, Belize (pp. 34-35). "Petrofabric Description" (pp. 37-56) is a lengthy treatment of ceramic nomenclature, and discussions of mineral abundances, granulometry, five petrofabric descriptions, and the analysis of raw material samples. Sunahara herself selected 45 raw material samples from 10 locations in the Belize River Valley (Table 4.1, p. 38). The five designations include Volcanic Ash 1, Volcanic Ash 2, Calcite 1, Calcite 2, and Granite 1. These are based on mineralogical identifications and characterizations of abundance and granulometry. Table 5.3 (pp. 55-56) provides information on the macroscopic and mineralogical identifications of the 45 specimens (11 were not thin-sectioned). In Chapter 6, "Analysis and Interpretations" (pp. 57-68), she reconsiders Belize Valley petrology, three locally-defined petrofabrics (Calcite 1, Calcite 2, and Granite 1), three hypotheses on the two volcanic ash petrofacies (local volcanic ash sources, the trade of volcanic ash, and the trade of volcanic ash ceramics), and extra-regional petrofabrics and their relationships to the models. Her "Conclusions" (pp. 69-71) include a synopsis, a consideration of regional interactions, interregional interactions and the relationships to the Belize River Valley and Late Classic Maya economy, with the obligatory "future research" as a final essay.

Sunahara's results suggest that Maya economic systems were much more complex than archaeologists have previously determined and she suggests that a hierarchy of sites existed that illustrates varying degrees of economic involvement in distributive networks. Local petrofabric distributional patterns and their importance to the local economic are characterized. Most utilitarian ceramics were produced in the Belize River Valley region. Calcite is consistent with the local geology, with Calcite 1 used in the fabrication of serving vessels (monochrome slipped bowls and dishes) whereas Calcite 2 is employed in the manufacture of coarse unslipped ceramics such as storage and cooking wares and large bowls. All of the sites sampled had both calcite petrofabrics in the specimens she studied. Granite 1 is also consistent with the locally available resources and was used in the production of large bowls and storage and cooking wares, but these ceramic had a restricted distribution. Sunahara was not successful in locating local volcanic ash sources that matches the ceramics. Volcanic Ash 1 is differentiated from Volcanic Ash 2 – the latter has crystalline calcite fragments in addition to ash. There is also a distinct distributional difference in these two. Pottery with Volcanic Ash 1 is found in all eight sites whereas Volcanic Ash 2 ceramics are limited to the larger sites (the two small sites of Blackman Eddy and Floral Park have none). El Pilar and Xunantunich were major centers and had pottery with all petrofacies.

She is conservative in her approaches and cites Dean Arnold's ethnoarchaeological research on potters and the distances to raw material resources in *Ceramic Theory and Cultural Process* (Cambridge: Cambridge University Press, 1985) but does not use Costin's paradigms (1991, 2001, 2005) to distinguish production specializations: "Craft specialization: issues in defining, documenting, and explaining the organization of production," in Schiffer, M. B. (ed.), *Archaeological Method and Theory*, Vol. 3, University of

Arizona Press, Tucson, pp. 1-56; "Craft production systems," in Feinman, G. M., and Price, T. D. (eds.), *Archaeology at the Millennium: A Sourcebook*, Kluwer/Plenum, New York, pp. 273-327; and "Craft production," in Maschner, H., and Chippindale, C. (eds.), *Handbook of Archaeological Methods*, Altamira Press, Walnut Creek, CA, pp. 1034-1107). The volume concludes with two appendices, Appendix A: "Inventory of Thin Sectioned Sherds..." (pp. 79-87) by petrofacies from six sites (Cahal Pech, Xunantunich, Blackman Eddy, Ontario Village, Floral Park, and El Pilar), and Appendix B: "Data Collection Form" (p. 88). Sunahara's volume concludes with useful 142 references; unfortunately, Anna O. Shepard is consistently referred to as "Sheppard" (p. 3, 25, 63, 73, 77).

Trade in the Western Mediterranean, AD 400-700: The Ceramic Evidence, Paul Reynolds, British Archaeological Reports International Series S604, Oxford: Tempus Reparatum, 1995. xv + 403 pp. (+ 47 unpaginated), 174 figures, 11 tables, bibliography, maps, ISBN-10 0860547825, ISBN-13 978-0860547822, £47.00 (paper). The author is currently ICREA Research Professor, University of Barcelona, Spain, and is also the author of British Archaeological Report S588, *Settlement and Pottery in the Vinalopó Valley (Alicante, Spain) A.D. 400-700*, ISBN 0 86054 749 3, published in 1993. His 1995 publication, the subject of this review, is a revision of Part 2 of his doctoral thesis (University of London, 1991); Part 1 of the thesis is the 1993 BAR publication. Part 2 is an expansive study of regional trends in imports of pottery and foodstuffs in the western Mediterranean in the late Roman, Visigoth and Early Arab periods developed from Reynolds's fieldwork in the Vinalopó Valley (Alicante), in the Iberian Peninsula. In his detailed and well-documented analysis, Reynolds discerns important differences in the sources of imported pottery in comparison to other west Mediterranean contexts. He also examines the composition of fine ware, coarse ware and amphora assemblages from a large sample of other sites, in the main, coastal loci.

"Chapter 1. Methods" (pp. 1-4) concerns the stratified contexts, survey materials, the "ideal" database and the sample available for analysis. "Chapter 2. Fine Wares" (pp. 5-37) focuses on African Red Slip Ware (ARS) in terms of production centers, quantities and export trends, ranges of forms and regional distributions, and related chronological data from the AD 3rd through 7th centuries. Other data is provided on Late Roman C/Phocaean Red Slip Ware (LRC), Late Roman D/Cypriot RS (LRD), and T.s. Paléochrétienne Grise. In "Chapter 3: Amphorae" (pp. 38-85), Reynolds considers the methods of analysis and details amphorae by geographic region and by chronological period when such data is available: North African, Iberian, Italian, Eastern Mediterranean, and unprovenanced specimens. "Chapter 4. Coarse Wares" (pp. 85-105) provides information on these ceramics chronologically with geographic distributions as known: 5th century AD, AD 500-c. 550 (late Vandal-early Byzantine periods), Byzantine forms: AD 533/550-7th century, and Miscellaneous Late Roman imports. Reynolds's "Chapter 5. Trade in the western Mediterranean, AC 400-700: The Ceramic Evidence" (pp. 106-141) considers political trends and shifts in

export policy, the regional production and distribution of foodstuffs, and related industries for the 2nd to 7th centuries. He also discusses briefly regional economic interdependence and cargoes and shipping routes, and a cursory assessment of the position of Alicante in its Mediterranean context.

“Appendices” A through D include a total of 55 separate appendices detailing the ceramics (pp 143-391). These include “Appendix A: Fine Ware Dating” (pp. 143-157) includes three parts, A.1 to A.3, on African Red Slip Ware. “Appendix B: Distribution Trends of Fine Wares, Amphorae and Coarse Wares” (pp. 158-161) has seven separate parts, two focusing on ARS and LRD pottery, four on amphorae, and one on selected coarse ware forms. “Appendix C: Site Data: The Vinalopó Valley and Cartagena (pp. 194-269) initially describes the pottery from excavations and is divided into four parts: 1: Summary of pottery [194-198], 2: Coarse Wares [199], 3: Source and class expressed as percentages of total coarse wares [200-201], and catalog [203-246]. Appendices C.2 through C.7 are summaries of pottery from the Benalúa site 42.2, the Santa Pola site 42.1, an analysis/summary of African Red Slip and other fine wares, distributions of amphorae, data on the Calle Soledad site African Red Slip and amphora, and materials from Plaza de los Tres Reyes. “Appendix D: Site Data: Other Mediterranean Sites” (pp. 270-391) includes information from 38 sites, D.1 through D.38. Among these are summaries of ARS, LRC, Bordeaux fine ware, and Eastern Mediterranean amphorae published by other authors (D.1 and D.3). The other sites include: Conimbriga, Valencia, El Grau Vell, Vila-roma, Torre Audiencia, Pollentia, Basilica de Fornells, Marseilles-La Bourse, Arles and Lyon, Toulon, Porto Torres, Ventimiglia, Baptistery of Albegna, S. Antonino di Petri, Luni, Schola Praeconum I and II, Temple Mater (Rome), Villa di Tiberio, Capua, Villa de San Giovanni di Ruoti, Cherche, Carthage (eight excavations by the British, Canadians, or Americans [University of Michigan] east-central Tunisia, Benghazi, Torca, and Saraçhane-Istanbul. The “Bibliography” (pp.393-302) includes 5 “Ancient Texts” and 212 “Modern Authors” entries.

Reynolds places the late Roman, Vandal, and Islamic ceramics from the Vinalopó Valley within the wider context of Mediterranean trade, and presents some basic conclusions on the nature of western Mediterranean commerce. Out of this incredibly detailed assemblage of data (two-thirds of the volume is devoted to the catalog) Reynolds considers significant trends over time, documents changes in taxation and shipping routes, and characterizes the waxing and waning geopolitical influence of the North African littoral. His complex arguments are carefully presented but sometimes rely on negative data, e.g., the absence of ceramic forms at particular sites and particular times during the three hundred year time span he considers.

Hispania and the Roman Mediterranean, AD 100-700: Ceramics and Trade, Paul Reynolds, London: Duckworth, 2010. xi + 372 pp., 25 tables, 30 figures, 12 maps ; ISBN-10: 0715638629, ISBN-13: 9780715638620 ISBN, £50.00/€65,54/\$80.00 (hardcover). In this new compendium, Reynolds becomes the first scholar to compile and review all the evidence documenting trends in production of table wares

and amphora-borne goods across the Iberian Peninsula and Balearics from the second to the seventh century CE. He employs both published excavation reports and papers, and provides new, unpublished data from his past and ongoing work in Beirut, Athens, Butrint, Durres, Carthage, Lepcis Magna and Zeugma, to write a comprehensive overview and synthesis. In this work he traces Iberian exports across the Roman Empire and provides a detailed synthesis of Roman trade in fine wares, coarse wares, and amphora-borne goods and shipping routes from the Black Sea and eastern Mediterranean to the western Empire, the Atlantic coast and Britain.

Reynolds’s “Preface” provides a context for this new synthesis, in which he observes that a vast literature has emerged since he conducted his original fieldwork and published the two British Archaeological Reports noted in the previous review. He also reports that his present position as ICREA researcher at the University of Barcelona has given him a special opportunity to continue his research and revise, reinterpret, and rewrite the draft of the current book. In the “Introduction” (pp. 1-14), he sets out the aims of the current volume, discusses recent research in late Roman pottery, characterizes the geographical setting, and discusses late Republican and early Imperial *Hispania* (augmented with three maps). All of the illustrative material is segregated in the latter two-thirds of the volume. It becomes clear that the maps, the numerical data presented in the tables, and vessel illustrations in the figures complement the narratives that follow. This is similar to the organization and presentation of materials in the 1995 volume but, unfortunately, makes it difficult for the reader to integrate the text and supplementary materials, so that the reader has to flip back and forth through multiple pages. However, the text reads extremely well and is “uncluttered” by the tabular material and illustrations.

In the initial chapter, “1. The Oil, Fish, and Wine Trade: *Hispania* and Her Competitors” (pp. 15-55; maps 4-6; tables 1-12, 17-19, 22; figures 1, 5, 6, 10, 17), he examines the 1st to 3rd centuries trade by Tunisia and other regional competitors, considers local oil production in *Hispania*, elaborates fish sauce and salted fish production, the 2nd to 4th centuries wine production and exports, the exports to Rome and regional production trends, Spanish wine production, and wine imports into *Hispania*. “2. Fine Wares, 3rd to Early 6th Centuries” (pp. 56-67; maps 4, 7-11; tables 12-14; figures 8-11, 17, 28) focuses on late Roman and south Gaulish fine ware ceramics, table ware production in central and northern Spain and Portugal, the importance of *terra sigillata hispánica tardía* (TSHT), alternatives regional table ware production, painted wares, and local fine wares from southeastern Spain. The subsequent chapter, “3. *Hispania* and the Mediterranean: 3rd to mid 6th Centuries” (pp. 68-119; maps 6, 12; tables 2, 4, 6, 7, 10, 12-26; figures 6, 14-19, 21), considers the 3rd century as one of transition, then examines *Hispania*, North Africa, and the East during the 4th century. Reynolds also evaluates exports from the East, the late 4th century to 425-450, before characterizing the “barbarian kingdoms” and their exports (Early and Mid-Vandal period), the Late Vandal and Eastern Mediterranean trade of the late 5th through mid 6th centuries, the general

distribution of pottery and products in the western and Atlantic regions, as well as the end of Spanish, Portuguese, and Balearic amphora exports. This chapter ends with a review of the mid-6th century Benalúa deposit in Alicante. In “4. 6th and 7th Century Trade: Fragmentation and Regionalisation” (pp. 120-135; tables 18, 20-25; figures 18, 20-30), he considers the Byzantine “reconquest” of southern Spain, and Byzantine *Hispania*, Carthage, and the Balearic Islands before reviewing general trends in the western Mediterranean and the last half of the 7th century. Reynolds’s “5. Conclusions” (pp. 136-156; tables 4, 15, 18, 23-24) focus on two topics: methodological problems and challenges, and his interpretation of the ceramic evidence.

The detailed narrative is augmented by an “Appendix: Pottery noted in the text and/or illustrations of Reynolds (1993)” (pp. 157-158); 12 maps (pp. 159-170) three of which have varying scales and nine have no scales; 30 figures (pp. 171-195) all but one of pottery with nine lacking scales; and 25 numbered tables (pp. 197-232) but there are actually 30 tables and sub-tables in this section. The 500 scholarly “Notes” take up a significant portion of the volume (pp. 233-310) and the “Bibliography” (pp. 311-348) includes 639 separate references. A useful double-column “Index” has two divisions: “Subjects, themes, and people” (pp. 349-361), and “Places” (pp. 361-372) which incorporate citations to maps, figures, and tables.

In this very specialized and important scholarly overview and synthesis, Reynolds has drawn together and assessed published and unpublished evidence on the production and distribution of Roman amphora-borne goods as well as fine wares and tables wares from the 1st through 7th centuries AD in the Iberian Peninsula and Balearic Islands. Trends in Iberian exports are identified for the Mediterranean Roman Empire and shipping routes in the eastern Mediterranean, Black Sea, to the Atlantic Coast and British Isles are characterized. The book is data heavy and has a reasonable number of illustrations (more would be useful). The dozen maps are a very valuable addition and distinguish this volume from his 1995 publication. The publisher’s “blurb” also mentions the inclusion of photographs – but there are none.

Uncorking the Past: The Quest for Wine, Beer, and Other Alcoholic Beverages by Patrick E. McGovern. Berkeley, Los Angeles, and London: University of California Press, 2009. xv + 29 pp., 24 figures, 4 maps, 10 color plates, ISBN 9780520253797, \$29.95/£20.95 hardcover. Pat McGovern is Scientific Director of the Biomolecular Archaeology Laboratory for Cuisine, Fermented Beverages, and Health at the University of Pennsylvania Museum. His previous books include *Ancient Wine: The Search for the Origins of Viniculture*, the 2004 Grand Prize winner in History, Literature, and Fine Arts, Organisation Internationale de la Vigne et du Vin. McGovern’s research on the origins of alcoholic beverages has been featured in the *Proceedings of the National Academy of Sciences* and *Nature* as well as *The New York Times*, *The New Yorker*, and elsewhere. Much of the archaeological, biomolecular, and chemical evidence for the fermentation of wine, beer, and other beverages comes from his analysis of ceramics. He provides a compelling story of humanity’s

ingenious, intoxicating quest for the perfect drink, following a tantalizing trail of archaeological, chemical, artistic, and textual clues.

This new book has a “Preface,” 9 chapters, “Select Bibliography,” “Acknowledgments,” and “Index.” The four maps provide a geographical and chronological context, illustrating the origins and diffusion of fermentation practices: Eurasia (pp. 14-15, for the period 100,000 BP→), Europe and the Mediterranean (pp. 130-131, 30,000 BP→), The Americas (p. 201, 20,000 BP→), and Africa (p. 232, 100,000 BP→). He asserts and documents that the cereal staples of the modern world were likely domesticated for their potential in making quantities of alcoholic beverages. These include the rice wines of China and Japan, the corn beers of the Americas, and the millet and sorghum drinks of Africa.

McGovern often relates seemingly disparate topics in a highly readable and compelling set of arguments about the development and spread of the process of fermentation. For example, he discusses the Paleolithic Hypothesis of fermentation and related topics such as the Yellow River and Neolithic practices, and evidence from Chinese poetry and teapots; Near Eastern red wine and beer (the latter the drink of the masses) and the issue “which came first, bread or beer?” Data from the sites of Çatal Hüyük and Jericho are reviewed along with Xenophon’s commentaries on beer. For Central Asia, he considers topics such as the role of the Silk Road, the Ferghana Valley, the Han Dynasty, Persian wines, drugs (ergot and *haoma*), and horse nomadism. To the west he comments on the site of Gordion and Phrygian grog. In Europe he focuses on heather, cannabís, mugwort, honey mead, birch-bark buckets, bog burials and pottery, and the Vikings. The Mediterranean area topics include Phoenicia, Byblos, the Sea Peoples, Dynastic Egypt, Crete, Myrtos, the Etruscans, amphorae and grape vines, and Carthage. For the New World, McGovern begins at the sites of Monte Verde and Guilá Naquitz then discusses teosinte, chicha, cacao beverages, the Ulúa Valley, teapots, *octli* cacti and pulque, Cerro Baul, manioc or cassava, tobacco, and mushrooms. The chapter on Africa considers the importance of Nile Valley, the Rift Valley, fermenting honey, the little-known Matupo painting, wine and beer making, cereal gruels, sour wheat beer (*bouza* in Arabic, but no relation to the English word “booze”, p. 246), ceramic drinking tubes, vats used as mash tuns, millet beer, and sorghum, the Nabta Playa site, sacred and secular users of the beverages, palm wine, and the arrival of bananas. In Chapter 9, he reviews evidence on fermented beverages, psychotropic and neurological effects on the brain, neurotransmitters serotonin, the ALDH1 gene, and alcoholic beverages in religion and art. He concludes: “Fermented beverages played a direct role in both military conquest and the transfer of cultures and technologies from one area to another” (p. 279).

Throughout the narrative, McGovern makes reference to Sam Calagione, owner of the Dogfish Head Craft Brewery in Milton, Delaware, who undertook McGovern’s challenge to brew beers using recipes deduced from the biomolecular and chemical research done at the University of Pennsylvania. Midas Touch, Chateau Jéahu, and Theobroma were among the

beverages Calagione was able to replicate, and the replication process is described in the narrative. According to McGovern, the perfect drink, it turns out -- whether it is mind-altering, medicinal, a religious symbol, a social lubricant, or artistic inspiration -- has not only been a profound force in history, but may be fundamental to the human condition itself.

The "Selected Bibliography" has 210 references while the very useful double-column "Index" includes archaeological sites and cultures, grains, fruits, cereals, and a range of other entries from residues to religion, chimpanzees to Chinese poetry, beerstone to molecular genetics, and Fritz Maytag to psychoactive plants. There are 133 separate entries on ceramics, pottery, containers, and drinking vessels. The kick-off for the book, including a book signing and beer tasting, was held on 8 October 2009 at the University of Pennsylvania Museum of Archaeology and Anthropology in Philadelphia, PA. The book is a delightful read and has pedagogical information and maps that would help enliven introductory lectures by illustrating archaeological ceramics and the fermentation process.

Ceramics in America 2009, edited by Robert Hunter and Luke Beckerdite, photography by Gavin Ashworth, Milwaukee, WI: Published by the Chipstone Foundation, distributed by the University Press of New England, 2010, xv + 232 pp., 374 illustrations (356 in color), ISBN 978-0-9767344-4-4, \$65.00 (cloth). This important annual volume, now in its ninth year of publication, *Ceramics in America* has become the journal of record for historical ceramic scholarship in the American context. The 2009 volume takes a thematic focus by reporting new research related to the rich and varied earthenware production in the 18th- and 19th-century Moravian settlements of Bethabara and Salem, North Carolina. The publication sets a new standard for historic era American ceramic studies in that this interdisciplinary effort draws on archaeology, art history, social history, religion, ceramic technology, and other areas of inquiry resulting in a substantively revised history of this much-admired North Carolina pottery tradition. Many examples of highly decorative slipware and intriguing figural bottles are illustrated for the first time with color photography by Gavin Ashworth. The editor, Robert Hunter, is a Fellow of the Society of Antiquaries of London, and an archaeologist and ceramic historian, while co-editor Luke Beckerdite, is the editor of *American Furniture* and a decorative arts scholar; both live in Williamsburg, Virginia.

The volume contains an "Editorial Statement" by Robert Hunter (p. vii), a "Preface" by Jonathan Prown, Lee L. French, and Martha Parker (pp. ix-x), "Acknowledgments" by the editors (p. xv), and an "Introduction" by Robert Hunter (pp. xi-xiv) in which the reader learns that the 2009 annual is the first of a two-part publication devoted to 18th and 19th-century earthenware ceramic traditions in the Carolina Piedmont of eastern North America. The major potters discussed are Gottfried Aust (1722-1788) who worked from 1755 onward; Rudolph Christ (1750-1833) who retired in 1821; and John Holland (1781-1843) who potted from 1821-1829. There are eight major contributions and I shall summarize each.

In "Eighteenth-Century Earthenware from North Carolina: The Moravian Tradition Reconsidered" by Luke Beckerdite and Johanna Brown (pp. 2-67, 96 figures, 142 endnotes), the authors discuss Moravian potters from Saxony who settled in Wachovia and especially Gottfried Aust who established the first pottery there in 1755. A change of location from Bethabara to Salem, North Carolina is also considered as is the founding of the Salem pottery in 1771 and Aust's tenure as the "master of the pottery." English Fabrique imitations of Staffordshire earthenware are also reviewed. Rudolph Christ founded the second Bethabara pottery and would become master at Salem in 1789; Gottlob Krause also practiced at Bethabara. The authors also consider Moravian potters who were potting in workshops on the periphery of Bethabara and Salem. "Staffordshire in America: The Wares of John Bartlam at Cain Hoy, 1765-1770" by Lisa Hudgins (pp. 68-80, 23 figures, 20 endnotes) focuses on the Cain Hoy pottery near Charleston, South Carolina, where the "Cain Hoy technique" was developed. Vessel forms and decorations are reviewed, notably, Barleycorn molded and Dot, Diaper, and Basket designs; Ring and Dot Impressed; and Cauliflower and Pineapple wares. Robert Hunter's chapter, "Staffordshire Ceramics in Wachovia" (pp. 81-104, 43 figures, 29 endnotes), reports a "Stranger Journeyman Potter" -- William Ellis -- and the production of Fineware ceramics. Rudolph Christ's return to Salem marked the end of the Fineware tradition.

"Tradition and Adaptation in Moravian Press-Molded Earthenware" by Johanna Brown (pp. 105-138, 61 figures, 84 endnotes) documents Aust as the earliest Moravian potter to make press-molded wares in North Carolina. The early wares fabricated included table- and teawares and press-molded faience ceramics made for market sales. There is a list of molds used by John Holland (1821-1829) that included fish bottles and flasks, figured bottles, toys, dolls, and flowerpots as well as non-figured press-molded bottles. Later press-molded table- and teawares are also noted among the ceramic traditions in Salem post-1821. "Salem Pottery after 1834: Heinrich Schaffner and Daniel Krause" by Michael O. Hartley (pp. 139-16, 39 figures, 13 endnotes) concerns Schaffner (1798-1877) who worked from 1834 onward and Krause (1836-1903) who worked until his death. Important excavations in Old Salem (2003 ff.) yielded archaeological data on Krause as the last master potter of Salem. In the search for his kiln, unexpected finds included creamware, animal-form bottles, and the use of slip decoration. Kiln furniture (trivets), molds, and bone tools and Moravian stub-stemmed tobacco pipes (pp. 157-160) were also recovered. Alain C. Outlaw's contribution "The Mount Shepherd Pottery Site, Randolph County, North Carolina" (pp. 161-189, 83 figures, 25 endnotes) focuses on central North Carolina west of Asheboro. This pottery was discovered on 1969, tested in 1971, excavated 1974-1974, and placed on the National Register of Historic Places in 1980. The locale includes a residence, workshop and kiln dated to the late 18th-century. Documentary research suggests that the potter in residence was Philip Jacob Meyer, Jr. Excavations produced bowls, dishes, porringers, teabowls, mugs, milkpans, saggars, stove tiles, and press-molded tobacco pipes.

“Making a Moravian Faience Ring Bottle” by Robert Hunter and Michelle Erickson” (pp. 190-197, 18 figures, 7 endnotes) describes the production of greenish-blue tin glazed bottles dated ca. 1793-1810. Excavations in 1968 at Salem, North Carolina helped to confirm the production techniques; the authors’ present a superbly illustrated reconstruction of the steps in producing the pad foot, ring body, and spout. “Making a Moravian Squirrel Bottle” by Michelle Erickson, Robert Hunter, and Caroline M. Hannah (pp. 200-216, 29 figures, 7 endnotes) focuses on the manufacture at Salem from 1804-1850 of two types of lead glaze earthenware bottles using plaster molds in the form of Eastern Gray squirrels. This volume also contains “Selected References (n = 87, pp. 217-220) and a triple-column “Index” of proper nouns, topics and figures (pp. 221-230). The editors have again presented the reader with a valuable compendium about ongoing research into ceramics made in America, this time focusing on the pottery traditions of the Carolinas. In this volume, Hunter revisits the interpretation of some of the assemblages from the Bethabara excavations and has illustrated the English style wares that William Ellis was producing. Lisa Hudgins provides a useful description of the wares that were excavated at Cain Hoy. These articles demonstrate that good quality English style creamware and mottled glaze wares were produced in the mid-18th-century, but the effort to sustain their production failed. These ceramics are only known because of the excavated wasters. We await the concluding volume in this set.

Success to America: Creamware for the American Market. S. Robert Teitelman, Patricia A. Halfpenny, Ronald W. Fuchs II, with Wendell D. Garrett and Robin Emmerson; Woodbridge, Suffolk, UK: Antiques Collectors’ Club, Ltd., 2010; 303 pp., 632 color illustrations, endpaper maps, ISBN-10 1851496319, ISBN-13 978-1851496310; £45.00/\$75.00; however there are sale prices as low as \$48.75 (hardcover). Published on 16 April 2010, this lavish, scholarly volume showcases what is thought to be the world’s finest collection of English creamware made for American customers in the period 1760 to 1820. Life in the early days of the young Republic was still closely tied to England and its resources. Americans who could afford to do so ordered their creamware sets of dishes and goods from English potters, who were pleased to produce and decorate the requested images that memorialized Revolutionary War heroes, newly elected presidents, maritime merchants, and patriotic sentiments; depicted the early 19th-century Boston firefighters; illustrated the struggle for liberty and the effort to end slavery; and recorded naval battles and scenes of early American life with hand-painted and transfer printed images on the smooth glaze of English creamware. Despite political embargoes, declarations of war, and skirmishes on land and sea, British potters provide desirable and meaningful goods for the American market, and these potters celebrated and commemorated the American cause.

One of the largest creamware collections was amassed by the late S. Robert Teitelman who passed away in February 2008 at the age of 91. In 1950 he purchased his first piece of patriotic pottery made in England for the American market and over the next half century developed a “world-class” collection of nearly 200 pieces. He wrote and lectured throughout America and

England, and his scholarship and enthusiasm earned him an international reputation. Teitelman has a longstanding relationship with the Winterthur Museum in Delaware, and part of his collection now forms the S. Robert Teitelman Collection at Winterthur. This book highlights 73 ceramics, 50 pieces in his collection and additional pieces and decorative arts objects from the Winterthur collection. The volume also brings together American and English scholars to consider the historical context as well as the ceramic history of the objects in a series of essays that address life in the young Republic, the Liverpool pottery industry, and the Atlantic maritime trade.

Patricia Halfpenny was Keeper of Ceramics at City Museum & Art Gallery, Stoke-on-Trent, from 1980 to 1995. Her research, lectures, and publications have established her as a recognized authority on Staffordshire pottery, especially that of the 18th century. She became Curator of Ceramics & Glass at Winterthur Museum & Country Estate in 1995 and co-authored the *Campbell Collection of Soup Tureens at Winterthur* (with Donald Fennimore) and *Passion for Pottery: Further Selections from the Henry H. Weldon Collection* (with Peter Williams). Ronald W. Fuchs II is Curator of the Reeves Collection of Ceramics at Washington and Lee University. He was the former Associate Curator of Ceramics for the Leo and Doris Hodroff Collection at Winterthur, and co-authored (with David Sanctuary Howard) the publication *Made in China: Export Porcelain from the Leo and Doris Hodroff Collection at Winterthur*. He worked with the Teitelman collection for many years, initially compiling the computerized catalog, then researching and writing for this book.

The volume has a “Foreword,” “Preface,” “Acknowledgments,” and a list of the “Authors and Contributors,” followed by three essays. Wendell D. Garrett contributed Chapter 1, “The Rising Glory of America” (pp. 15-29, 9 figures). He is Consultant to the American Department at Sotheby’s and the Editor-at-Large of *The Magazine Antiques*. Pat Halfpenny wrote Chapter 2, “Creamware and the Staffordshire Potteries” (pp. 30-39, 12 figures), while Robin Emmerson prepared Chapter 3, “Pottery and the Liverpool Trade” (pp. 40-67, 16 figures). Emmerson is presently the Head of Decorative Arts at the National Museum Liverpool; he was educated at Oxford University, the Courtauld Institute of Art, and Manchester University. These essays are accompanied by “Authors’ Notes (pp. 58-59). “The Catalogue” (pp. 62-239, 229 color figures), prepared by Teitelman, Halfpenny, and Fuchs II, is divided into five thematic parts: Rebellion and Revolution (6 vessels), Roots of a New Nation (28 specimens), Navigating the Commercial Waters (22 vessels), Commerce on Land (3 examples), and Patriotism (13 vessels). Historical Background Notes (pp. 240-241) reference six topics such as the American flag, Great Seal of the United States, Freemasonry, the Herculaneum Pottery, and stock prints of ships. The book also has 403 scholarly Endnotes (pp. 242-249). There are two appendices: Appendix I: The Jonathan Aborn Invoice, September 1802 (pp. 250-260, 11 color figures) by Emmerson and Appendix II: S. Robert Teitelman Collection (pp. 262-298, 355 color illustrations) by Halfpenny and Fuchs II. A Glossary of Marine Terminology (p. 299) by Fuchs II has 11 items, a brief Bibliography (p. 300) lists 50 sources, and a

four-column, proper noun Index, (pp. 301-303) complete the volume.

The book is a valuable contribution to the study of decorative arts and the production of specialized ceramics for a market economy. Halfpenny's chapter is especially enlightening and the illustrations are splendid. These wares captured the spirit of America and have been saved, often passed down as heirlooms, and have become a source of pleasure for collectors and a valuable dating tool for historical archaeologists.

Online Publication

Anna O. Shepard's "classic," *Ceramics for the Archaeologist*, Publication 609, Washington, DC: Carnegie Institution of Washington (including the "Forward to Fifth Printing: Ceramic Studies 1954-1964") 1985 reprinting: Braun-Brumfield, Inc., Ann Arbor, may be downloaded as a PDF at the Carnegie Institution's website: http://www.ciw.edu/publications_online/Ceramics_arch.pdf Also available online as a PDF are Shepard's *Notes from a Ceramic Laboratory* (100 pp) http://www.ciw.edu/publications_online/Notes_Ceramics_Lab.pdf The latter includes four publications: Anna O. Shepard (1963) *Beginnings of Ceramic Industrialization: An Example from the Oaxaca Valley*; Anna O. Shepard and E. W. Andrews (1963) *Imitation Jade Ornaments from Dzibilchaltun, Yucatan*; Anna O. Shepard and Hans B. Gottlieb (1962) *Maya Blue: Alternative Hypotheses*; and Anna O. Shepard and Harry E. D. Pollock (1971) *Maya Blue: An Updated Record*.

New Peer-reviewed Journal

Open Archaeometry [eISSN 2038-0615] is a new, online-only, international, open access peer-reviewed journal which publishes papers about the analysis of archeological materials using analytical techniques borrowed from the physical sciences and engineering. The publication is posted online from Italy: Open Archaeometry Journal, PAGEPress Publications, MeditGroup, via G. Belli 4, 27100 Pavia, Italy (telephone +39.0382.1751762, fax +39.0382.1750481). Blurb: "Open access journals are an ideal platform for the publication of your research enabling you to reach the widest available audience of biomedical professionals in your field of expertise. Publication in our journal means that your research articles will be available for immediate free access online." *Open Archaeometry* accept research articles, review articles, and brief reports and is published by PAGEPress Publications, which is now launching a range of peer-reviewed, Open Access scholarly journals covering several areas of medicine, biology, zoology and now archaeology. For additional information, see <http://www.pagepress.org/arc>

Previous Meetings

The Middle Atlantic Archaeological Conference was held in Ocean City, Maryland, USA, 18-21 March 2010. There were five general papers on ceramic materials and a workshop on ceramics with eight additional presentations. The general papers included: Amy Bertsch (Loudoun Archaeological Foundation) "On the Trail of Loudoun County Potters," Brock

A. Giordano (Dewberry and Richard Veit (Monmouth University) "Archaeological Evidence of Nineteenth-century Pottery Manufacturing in Elizabeth, New Jersey," Justin Bedard (URS Corporation) "The Appearance of Steatite Tempered Ceramics in the Chesapeake Bay Region: Social Compromise and the Dependent Innovation of Ceramic Technology," R. Michael Stewart (Temple University) "Stone Bowls and Pottery," and Lauren K. McMillan (East Carolina University) "An Evaluation of Tobacco Pipe Stem Dating in the Chesapeake." The meeting also included a "Regional Prehistoric Ceramic Technology Workshop" chaired by Bill Schindler (Washington College) with the following presentations: Chris Espenshade (New South Associates, Inc.) "Arrhythmia and the Chaîne Opératoire: Timing in Pottery Making," Daniel Griffith (Griffith Archaeological Consulting) and Charles Fithian (Delaware Division of Historical and Cultural Affairs) "American Indian Ceramics in Delaware," Jeff Kalin (Primitive Technologies) "Woodland Pottery Demonstration and Interactive Pottery Surface Treatment," Greg Lattanzi (New Jersey State Museum) and R. Michael Stewart and George Pevarnik (Temple University) "Technological Style in Pottery Analysis," Unnamed Presenters (Lost Towns Project of Ann Arundel County) "Prehistoric Ceramics from Pig Points (18AN50): Adding New Pieces to the Puzzle," Bill Schindler (Washington College) "Temper, Temper, Temper: A Workshop Highlighting the Attributes of a Variety of Tempers from the Middle Atlantic Region," Patrick H. Severts (Brockington and Associates) "Artistic Adaptation: Overcoming Clay," and Bob Wall (Towson University) "Early Late Woodland Page Ceramics from the Upper Potomac River Valley."

The Winterthur Ceramics Conference: Success to America was held at the Winterthur Museum & Country Estate, Winterthur, Delaware, USA on 15-16 April 2010. Presentations included: "'Just imported in the latest vessels from England': Staffordshire Pottery & Colonial America" by Pat Halfpenny (Ceramics Scholar and former Curator of Ceramics and Glass at Winterthur), "'Pots' from Liverpool and the Herculaneum Pottery" by Robin Emmerson, (Head of Decorative Arts, National Museums, Liverpool, England), "Ahoy! Ship Bowls in Pottery and Porcelain" by Ronald W. Fuchs II (Curator of the Reeves Collection, Reeves Center, Washington & Lee University, Lexington, VA), "American Merchants Order Ceramics from Abroad" by Leslie B. Grigsby (Curator of Ceramics and Glass, Winterthur), "Prints on Pots: The Invention & Development of Ceramic Printing" by Maurice Hillis (Researcher and Collector, Chester, England), and "Mr. du Pont's Ceramics from Abroad: Pagodas" by Maggie Lidz (Estate Historian, Winterthur). In addition there was a demonstration by Paul Holdway entitled "From Spode to Sadler, Glue Bat Printing"; four workshops: Robin Emmerson "A Closer Look at Wedgwood," Maurice and Lyn Hillis "Selections from 18th-Century English Porcelain," Pat Halfpenny "Underglaze Blue-Printed Earthenware," and Leslie Grigsby "Ceramic Figures: Comparisons and Contrasts"; plus a tour "Chinese Ceramics for the American Market, English Ceramics Living with Antiques: How H. F. du Pont Used His Ceramics." Other details are on the Internet at:

<http://www.artfixdaily.com/calendar/details/the-winterthur-ceramics-conference-success-to-america>

The Society for American Archaeology's 75th Anniversary Meeting was held in St. Louis, Missouri, USA from 14-18 April 2010. A total of 173 ceramics papers were presented on ceramic-related topics, including 149 oral papers and 24 poster presentations. With the conference located in St. Louis, there was a heavy representation from North America. The following summary is based on reading the abstracts of the papers and posters and calculating frequencies and occurrences of geographic loci and methodologies. North America: 81 (68 oral, 13 poster) with 35 Southwest, 30 Midwest/Plains, 10 Southeast, and 6 Northeast. Mesoamerica: 40 (39 oral, 1 poster) including 13 Southern Mesoamerican, 11 Central Highland, 6 Maya Lowland, and 4 Gulf Coast. Central and South America: 20 (13 oral, 7 posters) with 10 Peruvian, 5 Caribbean, and 3 Bolivia/Chile. Asia: 11 (10 oral, 1 poster) including 5 East Asian, 4 Southwest Asian, and 2 North Asian. Africa: 6 (all oral) with 3 East African, 2 West African, and 1 South African. Europe: 5 (all oral) with 3 Southeast European. Oceania: 4 (3 oral and 1 poster). Technical: 4 (all oral). Comparative: 2 oral (China/South Asia/Africa and Spain/Mexico/ Guatemala/Panama).

Methodologies employed (by frequencies): INAA/NAA 19, LA-ICP-MS 9, residue analysis (FCT, FTIR) 7, "compositional analysis" 5, petrographic thin sectioning 5, XRF 4, and digital radiography 3. The authors mentioned the following (one time each): LA-ICP-AES, LC-MD, ICP-MS, AMS, XRD, SEM, PIXE, Mossbauer, XR Powder Diffraction, XR Photoelectron Spectrometry, refiring experiments, and phytolith analysis. There were eleven papers and one poster presented on ceramic figurines.

Six SAA sessions focused on ceramics or were heavily weighted toward pottery, these were: 1) "Poster Session: Archaeological Science 2010, Part 1" (Sponsored by the SAS). Abstract: "The astonishing growth in archaeological science during the past decade, driven in large part by advances in technology, has culminated in an increasingly interdisciplinary "type" of archaeology that has allowed archaeologists to address a wider range of questions than previously considered possible. Increasingly, these questions are focused on prehistoric social interactions, cultural exchanges, migrations, trade, and the dynamic nature of group identifications. This session highlights analytical approaches and case studies in which science-based interdisciplinary approaches are used to explore questions grounded in modern archaeological science, i.e., archaeobiology, bioarchaeology, and archaeometry (e.g., dating methods, provenance studies, and prospection). 2) "General Session: Ceramic and Landscape Studies in the Maya Area." 3) Symposium: Mesoamerican Political Economy and the Politics of Production: Papers in Honor of Kenneth G. Hirth." Abstract: "From his early studies of interregional exchange in Central Mexico to his groundbreaking analyses of lithics at the urban center of Xochicalco, for close to four decades Ken Hirth has been making important contributions to how archaeologists study political economy, craft production, households, and urbanism in Mesoamerica. The papers in this

session highlight Hirth's many theoretical and methodological contributions to archaeology and also present new research that has been influenced by his impressive body of work. Presenters in this session include many of Hirth's longtime collaborators and colleagues, as well as past and present graduate students." 4) "General Session: Ceramic Analyses and Figurine Studies in Mexico." 5) Symposium: Searching for Structure in Ceramic Analysis: Applying Multi-Scalar Frameworks and Techniques to the Investigation of Pottery Production." Abstract: "This session is intended to provoke thinking about ceramic structure -- specifically, the analytical relevance of structure to the study of production and the necessary instrumentation for such investigation. By re-examining pottery structure from micro-, meso-, and macro-scales, the participants support the idea that the analysis of formation techniques, firing procedures, and decorative technologies can significantly contribute to the holistic analysis of past ceramic economies. When coupled with innovative instrumental techniques, this approach generates detailed ceramic production data that serve as a full and rich partner to the exchange dynamics illuminated by various forms of compositional analysis." 6) Symposium: Technological Transformations on the Colonial Frontier: New World Contact and Historic Period Technologist of Indigenous and Historic Populations." Abstract: "New World Colonial exploration and expansion generated new cultural interactions within and between Native Americans and Europeans. The transference and transformation of technologies was an important component of these interactions. European goods (metals, glass, high-fired ceramics, etc.) were introduced to native populations, and these native groups modified new materials for specific purposes and often attempted to learn and adapt new transformative technologies (e.g., smelting and metalworking). Symposium participants will present new data illuminating and contextualizing the technological, social and economic conditions of the use, adoption, adaptation and spread of new materials and their associated technologies in the New World."

I next list a few of the more scientifically-oriented presentations. Barker, Andrew (University of North Texas), Barney Venables (University of North Texas), Stanley Stevens (University of South Florida) and Steve Wolverton (University of North Texas) "Exploring Protein-Ceramic Interactions Using TOC Analysis, Protein Assays and LC-MS." Chiu, Scarlett (Academia Sinica, Taiwan), Christophe Sand (New Caledonia), Jiunn-Hsing Chao (Nuclear Science and Technology Development Center, National Tsing Hua University, Taiwan), William R. Dickinson (Department of Geosciences, University of Arizona, USA) and Yi-lin Chen (Research Center for Humanities and Social Sciences, Academia Sinica, Taiwan) "Characterizing Geochemical Compositions of New Caledonian Lapita Pottery via Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)" [ICP-MS and petrographic analysis]. Crider, Destiny (Arizona State University) "Pottery Paints and Technological Traditions: PIXE Characterization of Central Mexican Epiclassic and Early Postclassic Pottery" (poster). Eckert, Suzanne (Texas A&M University) and William D. James (Texas A&M University) "Using LA-ICP-MS to Determine Production Provenance for Basalt Tempered Pottery" (poster). Finley, Judson (University of Memphis) and

Laura Scheiber (Indiana University) "A Pilot Provenance Study of Intermountain Ware Ceramics in Western Wyoming" (poster) [NAA and petrographic analysis]. Forne, Melanie (Cancuén Project), M. James Blackman (Smithsonian Institution), and Ronald L. Bishop (Smithsonian Institution) "Fine Grey and Fine Orange: Early Presence and Foreign Provenience - Interpretations for Long-Distance Trade from Cancuén" [compositional analyses]. Gerke, Tammie (Glenn A. Black Laboratory of Archaeology), Erika Elswick (Indiana University), J. Barry Maynard (University of Cincinnati) "Bone Temper: The likely Source of Elevated Phosphorus in Angel Mounds State Historic Site Ceramics" [XRF and SEM]. Gjesfjeld, Erik (University of Washington) "Analysis of Ceramics from Kuril Islands, Russian Far East" (poster) [luminescence dating, XRF and INAA]. Golitko, Mark (University of Illinois at Chicago) and John Edward Terrell (Field Museum of Natural History) "Applications of LA-ICP-MS to the Study of Holocene Social Networks on the Sepik Coast of Papua New Guinea" (poster). Hartley, Charles and Alan Greene (University of Chicago) "From Structure to Composition and Back: Digital Radiography and Computed Tomography; Some Cases for Anthropological Contemplation" [digital radiographic and computed tomography]. Hays, Christopher, James Stoltman (University of Wisconsin-Madison), Richard Weinstein (Coastal Environments, Inc.) and Robert Tykot (University of South Florida) "Investigating the Exchange of Poverty Point Objects and Pottery in the Poverty Point Culture Using X-Ray Fluorescence and Petrographic Thin Sectioning." Hirshman, Amy (West Virginia University) "Appraising the Data: Resolving Multiple Inquires into the Nature of the Tarascan Ceramic Pastes" [chemical compositional, petrographic, and refining analyses]. Hung, Ling-yu (Washington University) and Jianfeng Cui (Peking University) "Investigating Majiayao Painted Pottery Production with LA-ICP-AES." Iñáñez, Javier (Smithsonian Institution), Jeremy Bellucci (University of Maryland), Richard Ash (University of Maryland), Robert J. Speakman (Smithsonian Institution) "Pb Isotope Characterization of Majolica Pottery from Spain and the Americas" (poster). Logan, Melissa (PaleoResearch Institute, Inc.) and Linda Scott Cummings (PaleoResearch Institute, Inc.) "Organic Residue Analysis: Finding Evidence of Foods Using FTIR" [FCR and FTIR].

Marshall, Joel (Glenn A. Black Laboratory of Archaeology, Indiana), Tammie L. Gerke (Glenn A. Black Laboratory of Archaeology, Indiana University) and Timothy E. Baumann (Glenn A. Black Laboratory of Archaeology, Indiana University) "Sun Circles and Science: Current Research on Negative Painted Pottery at the Angel Site. [XRF and residue analysis]. Naunapper, Linda (University of Wisconsin-Madison), Jeffrey R. Ferguson (University of Missouri (MURR) and Michael D. Glascock (University of Missouri (MURR) "Instrumental Neutron Activation Analysis of Midwestern Ceramics" (poster). Nielsen, Colin (McGill University) "Identifying Interactions on Prehistoric Eastern James Bay through Ceramic Sourcing" [INAA]. Niziolek, Lisa (University of Illinois-Chicago) "A Geochemical Study of Earthenware Production and Distribution in the Protohistoric Philippines" [LA-ICP-MS]. Oka, Rahul (University of Notre Dame), Chapurukha Kusimba (Field Museum of Natural

History), and Vishwas Gogte (Deccan College Post-Graduate and Research Institute, Pune, India) "Using Chemical Analyses (LA-ICP-MS) of Ceramics to Investigate Ancient Commercial Behaviors: Trade Booms, Market Capture, and Competition in the Indian Ocean Trade" (poster). Ramenofsky, Ann (University of New Mexico) and Adam Okun (University of New Mexico) "OHD and Glaze-Paint Ceramics: Multiple Chronologies, One Solution" (poster) [hydration values compared to that of glaze-paint ceramics]. Safi, Kristin (Washington State University), Christopher A. Kiahtipes (Washington State University), Dave N. Schmitt, Jean-Paul Ndanga and Karen D. Lupo (Washington State University) "Neglected Pots: Compositional Analysis of Ceramics from the Northern Congo Basin." Sakai, Sachiko (UC Santa Barbara) "Change in Production and Distribution Pattern of Olivine-tempered Ceramics in the Arizona Strip and Adjacent Areas in the American Southwest" [LA-ICP-MS and INAA]. Sharratt, Nicola (University of Illinois at Chicago), Laure Dussubieux (Field Museum of Natural History), Mark Golitko (University of Illinois at Chicago), and P. Ryan Williams (Field Museum of Natural History) "Clay Procurement in the Middle Horizon; LA-ICP-MS Analysis of Wari and Tiwanaku Ceramics from the Moquegua Valley, Peru" (poster). Stoltman, James (University of Wisconsin-Madison), Jigen Tang (Institute of Archaeology, Chinese Academy of Social Sciences), Yue Zhanwei (Institute of Archaeology, Chinese Academy of Social Sciences) and Zhichun Jing (University of British Columbia) "Petrographic Analyses of Ceramics Used in the Production of Shang Bronzes at Yinxunter." Stovel, Emily (Ripon College) "Looking Closely at One in the Face of Many: Characterizing San Pedro de Atacama Ceramics" (poster) [LA-ICP-MS and pXRF].

Vaughn, Kevin (Purdue University), Laure Dussubieux (The Field Museum), Ryan Williams (The Field Museum) and Sarah Cross (Purdue University) "Changing Political Economy in Nasca: A Pilot Compositional Analysis of Ceramics from the Kroeber Collection" [LA-ICP-MS]. Veerawan, Sutee (University of Arizona) "Technological Variation of the Production of Glazes on Khmer Ceramics from Ban Kruat, Thailand" (poster) [LA-ICP-MS]. Wagner, Ursel (TU-Muenchen), Friedrich E. Wagner (TU Munich), Josef Riederer (Rathgen Forschungslabor Berlin), Rupert Gebhard (Archaeologische Staatssammlung Munich) and Werner Haeusler (TU Munich) "A Mössbauer Study of Celtic Pottery Production in Central Europe" (poster) [Mössbauer spectroscopy, NAA, thin section microscopy, and XRD]. Williams, Veronica (CONICET-UBA) "Pottery Manufacture, Proveniences, and Pigments of Pre-Inca and Inca Archaeological Sites in Southern Andes" [NAA; Raman microscopy x-ray powder diffractometry and x-ray photoelectron spectroscopy]. Woods, Julie (University of Massachusetts, Amherst), David V. Hill (Center for Big Bend Studies, Sul Ross State University), Elizabeth S. Chilton (University of Massachusetts, Amherst), and Matthew T. Boulanger (Missouri University Research Reactor) "Giving Voice to Choice: Integrating Scientific, Ethnographic and Historical Analysis to Understand 17th Century Native Pottery from Western New England" (poster) [vessel lot analysis, ceramic petrography, and NAA]. Young, Michael (Richard

Grubb & Associates) "Technological Style and the Atlantic World System: A Case Study in African-Caribbean Pottery from Montserrat" [X-ray radiography]. Zovar, Jennifer (Vanderbilt University) "LA-ICP-MS Analysis of Ceramics from Late Prehispanic Bolivia"(poster).

The diversity of presentations on ceramic-related materials indicates that the archaeological sciences are alive and well at the SAA.

Forthcoming Meetings

The 38th International Symposium on Archaeometry (ISA 2010) is scheduled for 10-14 May 2010 in Tampa, Florida, USA. The meeting Chairman is Professor Robert H. Tykot (Department of Anthropology, University of South Florida, Tampa, FL 33620 USA, telephone (001) 813 974-7279, fax: (001) 813 974-2668, email: rttykot@cas.usf.edu) For General Information and Registration: ISA 2010 Program Secretary (Department of Anthropology, University of South Florida, Tampa, FL 33620 USA, telephone (001) 813 974-8760, fax: (001) 813 974-2668, email: ISA2010@usf.edu). The Symposium is composed of eight sessions, plus a special theme session on isotope analysis of human skeletal remains: 1) Field Archaeology (remote sensing and geophysical prospecting, sampling and field walking strategies, in situ observations of preservation, site monitoring); 2) Dating (new developments in dating techniques, novel applications, methods of combining dating strategies, new interpretation strategies, synchronization of cultures, cultural phase analysis); 3) Human-Environment Interactions (geoarchaeology, paleoclimate studies, landscape archaeology, environmental reconstructions); 4) Bioarchaeology (DNA, human diet, health, mobility, organic residues analysis, zooarchaeology, archaeobotany); 5) Technology and Provenance I (stone, pigments, plaster); 6) Technology and Provenance II (ceramics, glazes, glass, vitreous materials); 7) Technology and Provenance III (metals and metallurgical ceramics); and 8 Integrated site studies (combination of excavation procedures, scientific studies of materials and environment, and archaeological interpretation). The special thematic session is "Isotopic Analysis of Human Skeletal Remains." Additional information is available on the Internet at <http://isa2010.cas.usf.edu/>.

The session on "Ceramics and Glazes" has 13 oral presentations and there are 42 scheduled poster presentations. The oral papers are: "On finding diagnostic elements to sort ceramic chemical groups" by Hancock, Ron; Hughes, Michael; and Kostalena, Michelaki. "Firing temperature of pottery collected from the area of ancient Mesopotamia, Turkey, using luminescence techniques" by Polymeris, George S.; Kiyak, Nafiye; Gökgöl, Tuba; Canel, Timur; and Kitis, George. "Categorising the Simple Ware, the petrography of an ophiolitic and fossiliferous local pottery fabric from Tell Atchana, a second millennium urban centre in southern Turkey" by Groom, Simon D.; Cockrell, Bryan; and Bown, Paul. "Provenance study on Bronze Age pottery from Kaman: Kalehöyük, Turkey and its neighborhood by means of petrological methods" by Bong, Willy S.K.; Matsumura, Kimiyoshi; Yokoyama, Kazumi; and Nakai, Izumi. "A

chemical and mineralogical investigation of Late Bronze Age Nuzi Ware from the Near East" by Erb-Satullo, Nathaniel L.; Eremin, Katherine; and Shortland, Andrew. "Material Evidence for the use of Attic white-ground lekythoi in cremation burials" by Walton, Marc S.; Svododa, Marie; Mehta, Apurva; and Trentelman, Karen. "Glazed pottery surfaces under the microscope: Which criteria to decide about archaeological and modern items" by Zacharias, Nikolaos V.; Mastrotheodoros, Georgios; Katsiotis, Marios; and Laskaris, Nikolaos. "The amphorae from the Roman fish-salted factory of the Casa do Governador da Torre de Belém (Lisboa, Portugal): Inferences on their provenance" by Dias, M. Isabel; Prudêncio, M.I.; Filipe, I.; Fabião, C.; Marques, R.; and Franco, D. "Technology, production and distribution of Terminal Classic moulded-carved vases in central Maya Lowlands" by Ting, Carmen and Helmke, Christophe. "Santa María de la Antigua del Darién (Colombia): A first archaeometric approach to the material culture" by Buxeda i Garrigós, Jaume; Madrid i Fernández, Marisol; Ferrer, Samantha G.; and Alzate Gallego, Luz Adriana. "Permeability of know-how in Timurid tile-making process: Archaeometric approach" by Pacheco, Claire; Chapoulie, Rémy; Aucouturier, Marc; Dooryhee, Eric; Makariou, Sophie; and Miroudo, Delphine. "The enduring secret of Meissen porcelain" by Neelmeijer, Christian; Pietsch, Ulrich; and Ulbricht, Heike. "Optical and ICP-MS analyses of archeological ceramics from Ile-Ife, southern Nigeria: by Ige, Akin M.

The posters are: 1. "Data fusion and ceramics" by Bell, Suzanne C. and Zhang, Xinya. 2. "The Classical-Hellenistic ceramic assemblages on the territory of ancient Sagalassos (SW Turkey): An archaeometric approach" by Braekmans, Dennis; Degryse, Patrick; Poblome, Jeroen; and Neyt, Bert. 3. "Late Roman coarse wares productions identified at Santa Eulalia (Cagliari, Sardinia): Archaeology and archaeometry" by Cau i Ontiveros, Miguel Ángel; Tsantini, Evanthia; Sangiorgi, Silvia; Montana, Giuseppe; and Santoro, Sara. 4. "The Domesday Book of Scottish redware pottery" by Chenery, Simon R. and Haggarty, George. 5. "Pottery analysis of Bonampak, Chiapas, Mexico: by Chung, Heajoo; Victoria, Alfredo; and Tovalin, Alejandro. 6. Epiclassic and Early Postclassic central Mexican pottery paint recipes as evidenced through PIXE analysis" by Crider, Destiny. 7. "Application of instrumental neutron activation analysis for provenance study of ancient potteries and bricks from Buddhist sites of India" by Das, Nadukuru L.; Dasari, K.B.; Acharya, R.; and Reddy, A. V. R. 8. "ICP-MS with adaptable chamber laser: Quantitative analysis of ceramic artifacts in the museum environment" by Dussubieux, Laure; Golitko, Mark; Williams, Patrick Ryan; Cox, Richard. 9. "Application of QXRD and high resolution microscopy methods (AFM, PFM, CLSM) used for characterization of ancient ceramic matrices from 1300 B.C. (SW-Iran)" by Emami, Mohammadamin. 10. "Transport jars for a global world: First steps towards their archaeological and archaeometric thorough understanding in Early Modern period" by Ferrer, Samantha G.; Buxeda i Garrigós, Jaume; Iñáñez, Javier G.; Amores Carredano, Fernando; and Beltrán de Heredia Bercero, Julia. 11. "The combined use of petrography and petrology to investigate the inter-island pottery network in the Aeolian archipelago" by Fragnoli, Pamela; Sara Tiziana,

Levi; Brunelli, Daniele; and Guadagnini, Giulia. 12. "Romita ware: Technological characterization of a hybrid colonial ceramic" by Garcia-Inanez, Javier; Molera, Judit; Pradell, Trinitat; Madrid i Fernandez, Marisol; Buxeda i Garrigos, Jaume; and Speakman, Robert J. 13. "Archaeometrical characterization of majolica ceramics from St. Augustine (Florida)" by Garcia-Inanez, Javier; Watters, Gifford J.; Deagan, Kathleen; Glascock, Michael D.; and Speakman, Robert J. 14. "Potters and pigments: Preliminary technological assessment of pigment recipes of American majolica" by Garcia-Inanez, Javier; Madrid i Fernandez, Marisol; Molera, Judit; Speakman, Robert J.; and Pradell, Trinitat. 15. "Reassessment of elemental concentration data of sediments from the western delta of the Nile River: by Hancock, Ron and Michelaki, Kostalena. 16." Sourcing 'Monagrillo' pottery, the earliest in Panama (4,500-3,200 B.P.): Data from petrography and portable X-ray fluorescence and their relevance to Circulation" by Iizuka, Fumie. 17. "Production and distribution of pottery in a macro center of consumption: Valencina de la Concepción during III Millennium BCE by Inácio, Nuno; Nocete, Francisco; Nieto, José Miguel; Sáez, Reinaldo; Bayona, Moisés; and Daniel, Abril. 18. "Hellenistic period pottery production technology from Harabebezikan (Anlurfa/Turkey)" by Issi, Ali; Kara, Alpagut; and Ouz Alp, A. 19. "A detailed investigation into slip layers of Hellenistic ceramic wares from Dorylaion (Eskiehir-Turkey)" by Kara, Alpagut; Issi, Ali; Raškovska, Aleksandra; Grupce, Orhideja; and Mineva-Šukarova, Biljana. 20. "The Secrets of luster ware tiles analysis of the 13th -14th centuries used in Holy shrines of Qom and Mashhad" by Kolbadinejad, Maryam. 21. "Provenance studies on pottery sherds from Rogaland: Insights in manufacturing development of the Migration Period bucket-shaped pots" by Kristoffersen, Siv; Zimmermann, Udo; Ravn, Mads; Bertolino, Silvana; and Hauken, Åsa. 22. "The chemical composition, raw material and pottery manufacture of Tating ware" by Kulkova, Marianna and Plokhov, Alexey. 23. WLXRF spectroscopy of Il Khanid luster pottery of Aveh Lashkari, Arash; Shahidi, and Hamid Khatib. 24. "First steps towards the systematization of Historical Basque pottery (14th to 17th centuries): Archaeometric characterization of majolica from Araba and Bizkaia" by Madrid i Fernández, Marisol; Buxeda i Garrigós, Jaume; and Escribano Ruíz, Sergio. 25. "Pottery production at Tayma (north-western Saudi Arabia)" by Maritan, Lara; Mazzoli, Claudio; Giannetta, Mirko; and Hausleiter, Arnulf. 26. "Clay sediments diversity in the Troad and the provenance of Troian pottery" by Morales Merino, Carlos; Pernicka, Ernst; Balcazar, Miguel; Mucha, Hans-Joachim; Tagle, Roald; and Espinosa, Manuel E. 27. "Home-made recipes: Tradition and innovation in Bronze Age cooking pots from Akrotiri, Thera" by Müller, Noémi S.; Day, Peter, M.; Kilikoglou, Vassilis; and Nikolakopoulou, Irene. 28. "Variable selection using Procrustes analysis with stopping rule" by Munita, Casimiro S. and Oliveira, Paulo. 29. "Glass: Antique or new?" by Neunteufel, Robert. 30. "Provenance of regional ceramics in Pisidia (SW-Turkey)" by Neyt, Bert; Braekmans, Dennis; Degryse, Patrick; and Elsen, Jan. 31. Laser ablation-inductively coupled plasma-mass spectrometry: Using geochemical data to examine changes in pottery production patterns in the Prehispanic Philippines" by Niziolek, Lisa C. 32. "Secondary calcite in texture of pottery from Parse

police, Parse, Iran" by Noghani, Somayeh and Emami, Mohammadamin. 33. "Non-destructive and micro-invasive techniques for cultural heritage diagnostics: A case study of glazed tiles from Portuguese historical buildings" by Prudêncio, M. Isabel; Silva, T.P.; Dias, M.I.; Marques, J.G.; Figueiredo, M.O.; Esteves, M.L.; Botelho, M.L.; Trindade, M.J.; Burbidge, C.I.; and Marques, R. 34. "From the raw material to the finished object: How museum artefacts can help to reconstruct manufacturing processes of 19th century Persian pottery" by Reiche, Ina; Troalen, Lore; Röhrs, Stefan; Pretzel, Boris; Burgio, Lucia; Shah, Bhavesh; Tate, Jim; Martin, Graham; and Voigt, Friederike. 35. "Lead isotope analyses on White Slip II sherds from Late Bronze Age sites in Cyprus (Hala Sultan Tekke, Sanidha) and Syria (Ugarit) and their potential raw material sources" by Renson, Virginie; Coenaerts, Jan; Sauvage, Caroline; Mattielli, Nadine; Vanhaecke, Frank; Lorre, Christine; Rautman, Marcus; Nys, Karin; and Claeys, Philippe. 36. "Ceramic composition and competition at Mayapán, the last Maya capital" by Sanchez, Carmen G. 37. "Iberian coarse wares and amphorae from the workshop of 'El Cerro de las Balsas-Chinchorro' (Albufereta-Alicante)" by Tsantini, Evanthia; Cau i Ontiveros, Miquel Àngel; Martínez i Ferras, Verónica; and Rosser Limiñana, Pablo. 38. "Using non-destructive XRF analysis for sourcing of southeastern U.S. ceramics" by Tykot, Robert H.; DuVernay, Jeffrey; White, Nancy; Cogswell, L.; Rosado, L.; Robinson, A.; and Parker, S. 39. "Dwelling buildings of Torezk: Handicraft and trade settlement of XV c" by Valiulina, Svetlana I. and Valiulina, Julia. 40. "Complex analysis of Near East glazed ceramics from Bilyar" by Valiulina, Svetlana I. 41. "The earliest high-fired glazed ceramics in China: Scientific studies of the proto-porcelains from Zhejiang during the Shang and Zhou periods (c. 1,700 – 221 BC)" by Yin, Min. 42. "Combined inductively coupled plasma mass spectrometry (ICP-MS) and cathodoluminescence (CL) in provenance study of ceramics" by Zhang, Xinya; Bell, Suzanne; and Hirshman, Amy.

The Ceramic Petrology Group (CPG) will hold its Annual General Meeting at University of Nottingham, UK, 17 May 2010. The CPG is a forum for the discussion and development of petrographic and analytical techniques for the study of archaeological ceramics. Its membership includes academics, scientists, and students interested in innovative approaches to ceramic petrology and perfecting traditional methodologies. The meeting will include research reports on current and ongoing research. A 300-word abstract had to be submitted by 15 March to: alice.hunt@ucl.ac.uk Attendance is free for CPG members and £10 for non-members. For additional information, visit the CPG Web site at: www.ceramicpetrology.com.

The 20th European Association for South Asian Art and Archaeology is scheduled to be held at the University of Vienna, Vienna, Austria, 4-10 July 2010. This EASAA conference also marks the 40th anniversary of the association. The organizer is Prof. Deborah Klimburg-Salter (President, EASAA, University of Vienna). A frequent feature at previous meetings has been salient papers on ceramic materials. The conference will consist of two simultaneous sessions: one pre- and proto-historic archaeology and one historic archaeology

and art history; and poster sessions. We are still in the process of reorganizing the format of the conference, the exact structure will be announced on the website. Conference contributions should be drawn from current and unpublished research dealing with the archaeology and art history of South Asia. Topics from neighboring regions (i.e., Iran, the Tibetan culture zone, or Central Asia) will also be considered when they illuminate problems in South Asian archaeology or art history. Applicants may submit only one abstract for a 20 minute conference presentation or one poster presentation for peer review by a board of experts. Presentations and posters that have been accepted will appear in the book of abstracts. No one will be permitted to give more than one presentation. It is hoped that this new structure will allow for a decrease in the number of parallel sessions and an increase in the quality of interaction during discussions, in short to a more satisfying intellectual experience. Doctoral students who would like to submit a presentation are required to have attended at least one Conference of the EASAA and will additionally have to supply a letter of recommendation from their supervisor. We would like to especially encourage participants to apply for poster presentations rather than formal sessions. The Conference fees will be 180€ regular and a 110€ for students. All students automatically receive a scholarship. Students will be required to show a valid picture student ID during the collection of materials on-site and will have to pay the regular fee if failing to do so. If you have previously registered, but pay the fee in Vienna there is a 20 € penalty (=200 € fee). If you register for the first time in Vienna there will be a 40 € penalty. Thus, to register on site there is an increased fee of 220 €. For additional information, visit the Web site at: <http://www.easaa.org/>.

SEM and Microanalysis in the Study of Historical Technology, Materials and Conservation is the title of a conference to be held 9-10 September 2010 under the auspices of the Department of Conservation and Scientific Research at the British Museum. The organizers invite the participation of all those with an involvement or interest in the application of scanning electron microscopy and microanalysis (SEM-EDX) to the study of materials, manufacturing methods and deterioration processes of objects from ancient through to contemporary cultures. Topics that might be covered include the study of museum collections, archaeological finds and artists' materials. The call for papers had a deadline 19 March 2010; booking before 21 May: £160, students £110; and booking after 21 May: £190, students £140.

The purpose of the conference is to explore the huge influence that SEM and microanalysis techniques have had on the understanding of the material technologies of objects and on the long-term conservation and preservation of these materials. The sessions will also provide an opportunity to look forward to future applications and developments of the techniques in these areas. Papers and posters were invited from all aspects of these disciplines, which are often used with other complementary optical microscopy techniques, Raman, XRF, XRD, etc. to provide a full technological understanding of the materials and processes, from antiquity to contemporary collections. The conference will be in English and will include oral and poster

presentations; it is intended that the proceedings of the conference will be published.

There will be eight sessions over the two days. Papers are invited on a wide range of possible topics which fall under the following main themes: *Materials, technology and manufacturing processes*: Metals; ceramics; stone; glass; organics, textiles and paper; modern materials; pigments and artists' materials; mineralogy; tool-marks, wear and evidence of use; coinage; jewellery; manufacturing processes and workshop techniques (e.g. goldsmithing). *Conservation*: Condition of objects, repair methods and materials, physical and chemical treatments, environmental and preventive conservation issues, materials testing and evaluation, corrosion and degradation, new conservation treatments. *New applications and instrumental developments*: New applications of variable pressure/ environmental SEM and high resolution FE-SEM to the study and conservation of materials from antiquity to contemporary collections including integrated/hybrid systems. For registration and regular updates, please visit the conference Web site: http://www.britishmuseum.org/whats_on/events_calendar/sem_conference.aspx.

International Workshop: Hellenistic Ceramics in Anatolia (4th to 1st Century B.C.) is scheduled to be held 12-15 October 2010 at the French Cultural Center, Izmir, Turkey. There is currently no Internet site for this conference, which is designed to bring together Turkish, European, Mediterranean, and North American scholars to discuss a range of issues concerning Hellenistic ceramics in Anatolia, this conference should be an excellent opportunity to increase our knowledge of this material. It also aims to encourage dialogue among Turkish and European scholars in Hellenistic archaeology of the East. Both excavated finds as well as museum pieces are the subject of this workshop that is offering a firm base for the support of future research in Turkey concerning ancient pottery studies. Therefore pottery experts as well as museum curators from Turkey and neighboring countries are kindly welcome. This three-day workshop with a one-day excursion will contain lectures of 20 minutes each as well as poster presentations.

The goal of this meeting is to report on the state of research concerning the Hellenistic ceramics from Anatolia between the 4th and 1st-centuries B.C. The geographical areas concerned are Turkey and its close environs; the focus is, however, Asia Minor. The quantities of Hellenistic ceramics which have come to light on numerous sites, as well as recent research on the various collections from the geographical area concerned, now permit us to make significant additions to the archaeological evidence, thanks to progress in Hellenistic pottery research in Greece in the last two decades. The workshop has the main intention to present extensively the less well-known Hellenistic ceramics from Anatolia and other neighboring countries in the east. The conference will examine a series of questions which can be grouped as five principal interlinked and overlapping themes: production, trade-distribution, function, decoration and chronology.

Papers and oral presentations may be given in English, French, German, Italian, Greek or Turkish, but English will be the

preferred language for oral presentations. If you wish to participate, please complete and return a Registration Form; contact an organizer for the form and submit an Abstract of no more than 300 words (one illustration can be included, if necessary, in the Abstract; it should be sent by email in .tiff or .jpg format) together with the form before 31 August 2010 by email (if possible) to: hellenistic2010@gmail.com, or by fax to: +90.232.453 41 88. The contact address is: Prof. Dr. Binnur GURLER. Dokuz Eylul Universitesi, Fen-Edebiyat Fakultesi Arkeoloji Bolumu, Tinaztepe/Kaynaklar Yerleskesi Buca, TR-35160 Izmir, TURKEY. Members of the Organizing Committee include: Prof. Dr. Binnur GURLER (DEU), Doc. Dr. Ergun LAFLI (DEU), Doc. Dr. Gonca CANKARDES-SENOL (EU), Doc. Dr. Ahmet Kaan SENOL (EU), Dr. Aygun EKIN MERIC (DEU), Mr. Jean-Luc MAESO (FCCI).

Entry to the workshop is free of charge for all; accommodation and travel expenses will be paid by the participants, who should also arrange their own accommodation as necessary. A post-conference excursion on 15 October is planned to three ceramic collections in Izmir. The proceedings of the workshop is planned to be published in 2012. In addition to the workshop, an exhibition of current Turkish and international archaeological literature from various publishers will be displayed.

The Second International Symposium for Recent, International Advances in the use of pXRF and Other Portable, Field Technologies for Archaeochemical Studies of Historic Sites is scheduled to be held in Austin, Texas, USA in January 2011. Due to the resounding success and at the request of the participants of the "First Portable X-Ray Fluorescence (pXRF) Symposium" session at the 2010 Society for Historical Archaeology International Conference at Amelia Island Florida, the Wondjina Research Institute (WRI) and Country Chemist (CC) in association with INNOV-X Systems is sponsoring the "2nd International Symposium." The organizers are: Claudia Brackett (California State University-Stanislaus and the University of the Pacific) and Richard Lundin, RPA (Wondjina Research Institute), with sponsorship by INNOV-X Systems.

Blurb: "Below the surface of every landscape is chemical evidence of past human activity and, potentially, an historic site. Recent advances in the use of portable X-Ray Fluorescence (pXRF), RAMAN technologies and the reduction in costs for laboratory analyses have made these technologies affordable for field studies that "complete the circle of understanding" of historic era terrestrial and marine sites through the integration of archaeochemistry, Archaeogeophysics, literature research, oral interviews and excavation. We are looking for presentations from terrestrial and marine archaeologists who have used these new technologies for field and laboratory studies to gain insights into human behavior from the chemical "signatures" that have been left behind. Presentations are encouraged that integrate archaeochemical studies with Combined Survey Format (CSF) archaeogeophysical studies, petrographic provenience studies of lithics, ceramics and metals from field studies, museum studies, and heritage studies. International presentations will be encouraged and it is hoped that many of the recent, excellent,

presentations that have been made in other, international, forums will be presented. Some of the basic topics that presentations are being solicited include but are not limited to: 1) Basic chemistry of site formation and human activities; 2) Chemical characterization of various site types and activities; 3) Chemical characterization of marine sites via portable and laboratory analyses of plant, animal and sediment materials; 4) Limits of use of archaeochemical data; 5) Issues of contamination: Background chemical "noise" vs. "real chemical signatures" of human activity; 6) Case histories and studies of use of these technologies; 7) History of use of archaeochemistry over time to define sites and features; 8) Integration of archaeochemical data into Combined Survey Format studies; 9) Use and limitations of archaeobiochemical studies; 10) Research on deep sea field archaeochemical studies; and 11) Archaeochemical data analysis."

The organizers are also working on a potential method to have remote participation for those who cannot, physically, attend the conference. So, please, feel free to submit even if you are constrained in your ability to travel to Austin for the session. Proposals are due to WRI and CC by 10 June 2010 and should be sent to Dr. Claudia Brackett at countrychemist@yahoo.com For further information and to discuss a potential submission, please contact Rich Lundin, RPA, at Wondjina@sonic.net.

Exhibition

Amphora Collection Exhibit: A collection of amphora held by the University of Missouri's Museum of Art and Archaeology (Pickard Hall, east side of the Francis Quadrangle), Columbia, Missouri, USA, has recently been placed on exhibit. The Museum's hours are from 9 a.m. to 4 p.m. Tuesdays through Fridays; and from noon to 4 p.m. Saturdays and Sundays. These vessels were collected from sites in Spain, France, Sicily, Greece and northern Africa. For additional information, visit the Museum's Internet site at: <http://maa.missouri.edu/>.

ARCHAEOLOGICAL PROSPECTION AND SATELLITE REMOTE SENSING

Apostolos Sarris, Associate Editor

Conferences and Workshops

International Aerial Archaeology Conference. AARG 2010 Bucharest, Romania, September 15-18, 2010. The conference is organized by the Institutul de Memorie Culturală (CIMEC) and the Aerial Archaeology Research Group at Bucharest Romania. Proposals for papers, posters and sessions are invited until May 31, 2010. A pre-conference workshop is devoted to Remote-sensing mapping programmes in archaeology: Planning, Organisation, Results. Students and young researchers' bursaries are available to support bona fide students and young researchers who are interested in aerial archaeology and wish to attend the conference. For more information: <http://aarg2010.cimec.ro>.

International Colloquium on Geoarchaeology: Landscape Archaeology, Egypt and the Mediterranean World, Cairo, Egypt, September 19-12, 2010. The international colloquium is organised by the Institut Français d'archéologie Orientale (Ifao) in association with the Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement (CEREGE, CNRS, UMR 6635) and the Centre Franco-Égyptien d'Étude des Temples de Karnak (CFEETK), USR 3172, CNRS, under the patronage of the Working Group on Geoarchaeology of the International Association of Geomorphologists.

The international colloquium will be dedicated primarily to Egypt and the Mediterranean context. Its primary objective is to throw light on the evolution of the River Nile, a major component of the Egyptian landscape and its impact on the peripheral spaces (coasts, flood plain, desert wadis and their tributaries). However, are hoping to throw a wider net over the larger Mediterranean environment by welcoming additional case studies that will better emphasise Egyptian conditions.

The topics addressed in the colloquium include river and coastal landscapes, desert and urban landscapes, the Nile and its Delta, archaeology and climatic changes, natural hazards and geomatics, survey techniques, historical sources and landscapes. For more information: <http://www.ifao.egnet.net/uploads/manifestations/2010/geoarcheo/Geoarcheo2010-circular1.pdf>.

Scholarships and Studentships

University of Mainz: PhD studentship in archaeological geophysics. The University of Mainz is developing a new Research Group in archaeological prospection and welcomes applicants for a fully-funded PhD studentship in archaeological geophysics. The successful candidate will study the use of geoarchaeological methods in improving our understanding of the geophysical behaviour of archaeological remains. The research is also relevant to research in agronomy and environmental geophysics and the project may therefore also appeal to those wishing to pursue careers in these fields. The project may suit applicants with a background in geoarchaeology, archaeological geophysics, environmental geophysics or soil physics. Potential candidates should contact me, with brief Curriculum Vitae, at the following address to receive further details: Johannes Gutenberg Universität Mainz, Archaeological Prospection Research Group, Institut für Geowissenschaften, Johann-Joachim-Becher-Weg 21, D-55128 Mainz, Germany or jordand@uni-mainz.de.

ARCHAEOMETALLURGY

Thomas R. Fenn, Associate Editor

The column in this issue includes the following categories of information on archaeometallurgy: 1) New Books; 2) New Articles/Book Chapters; 3) Ph.D. Theses; 4) Previous Meetings; and 5) Forthcoming Meetings.

New Books

Metallurgy: Understanding How, Learning Why: Studies in Honor of James D. Muhly, edited by Philip P. Betancourt and Susan C. Ferrence, INSTAP Academic Press, Philadelphia, PA. Prehistory Monograph 29. Expected Summer 2010, est. p, 160 est. b/w ills, 15 est. tbs, ISBN: 1931534578; 9781931534574, US \$80.00/GB £55.00 (hardback). Prof. James D. Muhly has enjoyed a distinguished career in the study of ancient history, archaeology, and metallurgy that includes an emeritus professorship at the University of Pennsylvania and a term as director of the American School of Classical Studies at Athens as well as receiving the Archaeological Institute of America's Pomerance Award for Scientific Contributions to Archaeology. In Muhly's honor, a total of 38 eminent scholars have contributed 30 articles that include topics on Bronze and Iron Age metallurgy around the Eastern Mediterranean in such places as Crete, the Cyclades, Cyprus, and Turkey. These contributions comprise "Life with Jim Muhly" (Polymnia Muhly), "Bibliography of James D. Muhly", "Introduction" (Philip P. Betancourt and Susan C. Ferrence), "Cypriot Chalcolithic Metalwork" (Edgar Peltenburg), "Miniature Ingots from Cyprus" (Alessandra Giumlia-Mair, Vasiliki Kassianidou, George Papasavvas), "Broken Symbols: Aspects of Metallurgy at Alassa" (Sophocles Hadjisavvas), "A Metallurgical Feast?" (Vassos Karageorghis), "Blowing the Wind of Change: The Introduction of Bellows in Late Bronze Age Cyprus" (Vasiliki Kassianidou), "A Newly Re-discovered Cypriot Tripod-stand in the Florence Archaeological Museum" (Fulvia Lo Schiavo), "From Smiting into Smithing: The Transformation of a Cypriot God" (George Papasavvas), "Reconstructing Early Cretan Metallurgy: Analytical Results from the Study of the Metallurgical Evidence from Kephala Petras, Siteia" (Mihalis Catapotis, Yannis Bassiakos, Yiannis Papadatos), "Silver and Bronze Artifacts from the EM I Necropolis at Gournes, Pediada" (Kalliope E. Galanaki, Yannis Bassiakos), "The Dog Diadem from Mochlos" (Jane Hickman), "The Triangular 'Daggers' of Prepalatial Crete" (Keith Branigan), "A Marine Style Gold Ring from the Hagios Charalambos Ossuary: Symbolic Use of Cockle Shells in Minoan Crete?" (Philip P. Betancourt), "Metalworking at Malia, Quartier MU: High or Low Technology?" (Jean-Claude Poursat, Cécile Oberweiler), "The Origins of the Mochlos Sistrum" (Jeffrey S. Soles), "Akrotiraki and Skali: A Preliminary Report on New Evidence for EBA Lead/Silver and Copper Production from Southern Siphnos" (Zoi D. Papadopoulou), "Early Bronze Age Copper Smelting on Seriphos (Cyclades, Greece)" (Olga Philaniotou, Yannis Bassiakos, Myrto Georgakopoulou), "Searching for the Early Bronze Age Aegean Metallurgist's Toolkit" (Christos G. Doumas), "Technological Aspects of Bronze Age Metallurgical Ceramics in the Eastern Mediterranean" (Anno Hein, Vasilis Kilikoglou), "Slags from the Late Bronze Age Metal Workshops at Kition and Enkomi, Cyprus" (Andreas Hauptmann), "The Metallurgy of Iron during the Early Years of the Iron Age" (Robert Maddin), "Copper Oxhide Ingots and Lead Isotope Provenancing" (Noël H. Gale), "'Biscuits with Ears': A Search for the Origin of the Earliest Oxhide Ingots" (Zofia Anna Stos-Gale), "Metal Exchange in Italy from the Middle to the Final Bronze Age (14th–11th century B.C.E.)" (Reinhard Jung, Mathias Mehofer, Ernst Pernicka), "Cyprus,

Copper, and Alashiya" (A. Bernard Knapp), "Alashiya: A Scientific Quest for its Location" (Robert S. Merrillees), "Hittite Metals at the Frontier: A Three-Spiked Battle Ax from Alalakh" (K. Aslihan Yener), "Sources of Tin and the Tin Trade in Southwest Asia: Recent Research and Its Relevance to Current Understanding" (Vincent C. Pigott), and "Three Copper Oxide Ingots in Şanlıurfa Archaeology Museum, Turkey" (Cemal Pulak). More general information or for purchasing the book in the US can be found at: <http://www.oxbowbooks.com/bookinfo.cfm/ID/72695/Location/DBBC>, or information for the UK and Europe at: <http://www.oxbowbooks.com/bookinfo.cfm/ID/72695/Location/Oxbow>.

Metal, Nomads and Culture Contact: The Middle East and North Africa, by Nils Anfinset, Equinox Publishing, London. Approaches to Anthropological Archaeology series. 2010, 256p., 246x174mm, 76 figures, ISBN: 1845532538; 9781845532536, US \$120.00/GB £60.00 (hardback). This book contextualizes and synthesizes the major cultural changes that took place in the southern Levant and northeast Africa during the 5th and 4th millennia BC. The basis is the major changes that took place with reference to animal husbandry, agriculture, exchange and interaction. The focus of the book is the introduction of metal to the southern Levant, Egypt and Lower Nubia and the role of pastoral nomadism in a context of cultural change and contact. The implications of these developments are discussed in a context of increased exchange and the development of more complex societies. With reference to the introduction of metal, the implications are explored on a social level concerning the exchange system, social transformation and the role of metal in these societies. Details on the Table of Contents and purchase information can be found at the publisher's website: <http://www.equinoxpub.com/books/showbook.asp?bkid=232&keyword=>.

Crossroads / Carrefour Sahel. Cultural and technological developments in first millennium BC / AD West Africa. Développements culturels et technologiques pendant le premier millénaire BC / AD dans l'Afrique de l'Ouest, edited by Sonja Magnavita, Lassina Koté, Peter Breunig, P., and Omarou A. Idé, 2009. *Journal of African Archaeology Monograph Series* Volume 2. Africa Magna Verlag, Frankfurt a. M. Several contributions to this edited volume address recent metallurgical research in West Africa. Contributions include "Iron Metallurgy in West Africa: An Early Iron Smelting Site in the Mouhoun Bend, Burkina Faso" (Augustin F.C. Holl), "Contacts Between West Africa and Roman North Africa: Archaeometallurgical Results from Kissi, Northeastern Burkina Faso" (Thomas Fenn, David Killick, John Chesley, Sonja Magnavita, & Joaquin Ruiz), "La question du fer dans le vallée de la Mekrou, Niger méridional" (Omarou A. Idé), "La métallurgie du fer au Sahel burkinabé à la fin du 1^{er} millénaire" (Jean-Marc Fabre), "La métallurgie ancienne du fer en Côte d'Ivoire: Etat des connaissances et perspectives de recherche" (Timpoko Hélène Kiénon-Kaboré), "L'ancienne métallurgie de fer en Afrique de l'ouest - Problèmes ethnoarchéologiques et interprétations" (Hans Peter Hahn), and "La métallurgie traditionnelle du fer et la fondation du Royaume de Wogdogo

(Ouagadougou, Burkina Faso)" (Lassina Simporé). Information on purchasing this volume can be found at: <http://www.african-archaeology.de/>.

Forgerons et sidérurgie en pays dogon. Vers une histoire de la production du fer sur le plateau de Bandiagara (Mali) durant les empires précoloniaux, by Caroline Robion-Brunner, 2010. *Journal of African Archaeology Monograph Series* Volume 3. Africa Magna Verlag, Frankfurt a. M. Information on purchasing this volume can be found at: <http://www.african-archaeology.de/>.

New Articles/Book Chapters

From *Journal of Field Archaeology* 2009, 34(2): 135-151 comes "Identifying a Roman Casting Pit at Tel Dor, Israel: Integrating Field and Laboratory Research" (Adi Eliyahu-Behar, et al.), and from 2009, 34(1): 57-75, comes "The Context and Significance of Copper Artifacts in Postclassic and Early Historic Lamanai, Belize" (Scott E. Simmons, et al.).

In 2009, the Historical Metallurgy Society (HMS) produced two volumes of ***Historical Metallurgy*** (Vol. 43, Nos. 1:1-74 & 2:75-1xx). Contributions in the first issue of *Historical Metallurgy* Vol. 43 included "The potential of metallography in investigations of early objects made of copper and copper-based alloys" (N. Ryndina), "Bole lead smelting technology and the Linch Clough (Derbyshire) bole" (L. Willies), "Understanding hammerscale: the use of high-speed film and electron microscopy" (D. Dungworth, R. Wilkes), "Investigation of a 16th-century gun powder chamber from the Tudor warship Mary Rose" (R. Walker, A. Hildred), "A photographic record of a water-powered wire-works at Thurgoland, Yorkshire" (K. Hawley, D. Crossley), while the second issue of HA comprised "Robert Erskine's letters of 1770 about the British iron and steel industry" (C.S. Johnson), "Overspun strings from 18th- and 19th-century English square pianos" (M. Goodway), "Puddling: a metallurgical perspective" (M.C. Flemmings, D.V. Ragone), "In the footsteps of Ananda Coomaraswamy: Veralugasmarkanda and the archaeology and oral history of traditional iron smelting in Sri Lanka" (G. Juleff, P.T. Craddock, T. Malim with contributions by I.C. Freestone and C.R. Cartwright). The first issue concludes with both book reviews and abstracts of recent works on ancient and historic metals and metallurgy and the second with book reviews.

A new journal, ***Archaeological and Anthropological Sciences***, which began publication in 2009, already has included several articles pertaining to archaeometallurgy. The third issue of the first volume was dedicated to papers presented at an international workshop, *Lead Isotopes and Archaeometallurgy*, held in Fribourg, Switzerland, June 2008. The papers presented in this special issue comprised an introductory chapter, "Lead isotopes and archaeometallurgy" (F. Cattin, B. Guénette-Beck, M. Besse, V. Serneels), as well as "Lead isotopic measurements in archaeological objects" (Igor M. Villa), "Combined Pb-Sr isotopic analysis in provenancing late Roman iron raw materials in the territory of Sagalassos (SW Turkey)" (Patrick Degryse, Jens C. Schneider, Philippe Muchez), "Copper supply during the Final Neolithic at the Saint-Blaise/Bains des Dames

site (Neuchâtel, Switzerland)” (Florence Cattin, Igor M. Villa, Marie Besse), “Tracing Roman lead sources using lead isotope analyses in conjunction with archaeological and epigraphic evidence - a case study from Augustan/Tiberian Germania” (Michael Bode, Andreas Hauptmann, Klaus Mezger), “Metal provenancing using isotopes and the Oxford archaeological lead isotope database (OXALID)” (Zofia Anna Stos-Gale, Noël H. Gale), and “New insights into the ancient silver production of the Wallis area, Switzerland” (Barbara Guénette-Beck, Nicolas Meisser, Philippe Curdy). The final issue of Volume 1(4) also contained “Metallurgy and specialisation in Prepalatial Mesara, Crete” (Thomas Tselios), while the first issue of 2010, Vol. 2(1), included “Characterisation of the raw metal sources used for the production of copper and copper-based objects with copper isotopes” (Sabine Klein, Gerhard Peter Brey, Soodabeh Durali-Müller, Yann Lahaye). The number of archaeometallurgical papers already published in the first five issues of this journal bodes well for future submissions and publication.

The *American Journal of Archaeology* published, in 2009, Volume 113(4), the article “From Metallurgy to Bronze Age Civilizations: The Synthetic Theory” by Nissim Amzallag. Subsequently, in 2010, Volume 114(2), the *AJA* also published a response to this article “A Chalcolithic Error: Rebuttal to Amzallag 2009” by C. P. Thornton, J. M. Golden, D. J. Killick, V. C. Pigott, T. H. Rehren, and B. W. Roberts, and a rebuttal to that response “A Return to the Dark Ages? Reply to Thornton et al. 2010” by Nissim Amzallag.

On African metallurgy is “Pre-Colonial Iron Production in Western Uganda: Recent Survey and Excavation” by Louise Iles, published in No. 71, June 2009 issue of *Nyame Akuma*, Bulletin of the Society of Africanist Archaeologists.

Ph.D. Theses

Modalités d'approvisionnement et modalités de consommation du cuivre dans les Alpes au 3e millénaire avant notre ère : apport des analyses métalliques à la connaissance des peuplements du Néolithique final, du Campaniforme et du Bronze ancien. Florence Cattin (Dép. d'anthrop. et d'écologie de l'Univ., Genève, 2008, 458 pages, 53 tables, 127 figures, CD-ROM).

The Bell Beaker culture forms a complex cultural presence in Europe during the 3rd millennium BC. It is defined above all by the presence of a reversed decorated bell-shaped beaker. Since its discovery, the Bell Beaker culture continues to fuel research on many related issues. Present from Morocco to Denmark, the British Isles to Poland, this phenomenon is still studying by many on various research projects. How to explain the presence of this decorated beaker throughout Europe? Interpreted as a population invading Europe, exchanges within an elite or an ideological expression, the decorated bell-shaped beaker doesn't fit a cultural identity. Undoubtedly, the purpose of the decorated beaker does not solve alone the Bell Beaker culture enigma.

Focused on typical Bell Beaker ceramics for a long time, research of these last thirty years have focused on understanding the phenomenon through other cultural components, first by studying nondecorated ceramics, known as common ware and then by studying lithic industry, ware petroarchaeology and biological anthropology. Headed by Professor Marie Besse, a research group focused on the 3rd millennium BC was formed at the University of Geneva, Switzerland (Laboratoire d'archéologie préhistorique et d'histoire des peuplements, Département d'anthropologie et d'écologie) in early 2003. It aims to bring new keys in understanding this phenomenon within three Swiss National Science Foundation funded projects (proposal FNS 101412-100599, M. Besse, 2003-2006: L'Europe du 3e millénaire avant notre ère: des faits archéologiques à l'interprétation du peuplement; proposal FNS GE-112885, J. Desideri, 2006: Europe during the third millennium BC and Bell Beaker Culture phenomenon: Peopling history through dental non-metric traits study; proposal FNS PP 001-102710, M. Besse, 2004-2008: Le Chalcolithique européen: céramique, cuivre et histoire du peuplement). Through this research, we provide a novel approach regarding the Bell Beaker culture establishment and development through the study of copper metallurgy. First, we look at the role of Bell Beaker culture in the adoption and use of copper, especially looking if this period coincides on the Alps with the establishment of first metallurgy, if it had a role in the use of copper and if the Bell Beaker culture may be related to the Valaisan's mineral exploitation. Second, we look at the areas that influenced the cultural components of the Late Neolithic, the Bell Beaker culture and the Early Bronze Age.

Therefore, we set a framework for the discovery of metal and metallurgical Bell Beaker culture on the Alps and compare it to the previous and following periods, i.e. Final Neolithic and Early Bronze Age respectively. We look also to the metal analysis, which may give us clues as to the origin of metal through the joint use of lead isotope analysis and the chemical element composition. In this context, we are developing new analytical data on a corpus of 141 copper based items composed of 129 lead isotopic analyses and 58 element chemical composition analysis. Origins of these items were from western Switzerland for the Neolithic (Concise/sous-Colachoz, Vaud; Saint-Blaise/Bains des Dames, Neuchâtel; Sion/Tourbillon, Valais; Vétroz, Valais), Bell Beaker (Onnens/Le Motti, Vaud; Sion/Petit-Chasseur, Valais) and Early Bronze Age (Ayent/Les Places, Valais; Chamoson, Valais; Concise/sous-Colachoz, Vaud; Conthey/Sensine, Valais; Conthey/Tombe, 1972, Valais; Leuk-Loèche/Forêt de Guttet, Valais; Sion/Petit-Chasseur, Valais; Vétroz, Valais), between 2700 and 1600 BC. Moreover, we provide new lead isotope analyses ratios of 73 ore samples from major Valais copper mineralization, seven samples from the cantons of Vaud, Bern and Graubünden and six samples from the mines of Roua (Alpes-Maritimes, France), Saint-Véran (Hautes-Alpes, France) and Alagna Valsesia (Piemont, Italy) for comparison. Lead isotope analysis has been conducted by ourselves at the Laboratory of Isotope Geology (University of Bern, Switzerland). The Swiss National Museum (Affoltern-am-Albis, Switzerland) and the EMPA Material Science and

Technology (Dübendorf, Switzerland) carried out the element chemical composition analysis.

Main results indicate that, except in the renewal of the object types, Bell Beaker culture does not seem to have a major influence in the development of metallurgy on the Alps, where the use of copper was already attested to the Late Neolithic. Similarly, with our present knowledge, it is unlikely that the Bell Beaker settlement in western Switzerland is linked to the exploitation of Valaisan copper resources. Furthermore, our data do not support the hypothesis of metal prospectors which has been proposed as an explanation of this phenomenon. Metal compositions of Final Neolithic, Bell Beaker and Early Bronze Age objects from eastern Switzerland suggest a break between the Bell Beaker and the other two periods. However, this break must be moderated by the few objects that could have been analyzed for the Bell Beaker culture. In the area studied, this small quantity of Bell Beaker metal objects may result from several factors, including cultural events, poor conservation of remains, metal recycling, state of archaeological knowledge and proper identification of Bell Beaker sites.

For the Neolithic and Early Bronze Age, we have identified respectively ten and eight copper poles, which we define as isotopic fields who bear the fingerprint of one (or a group) of predominant copper source(s). A pole is characterized by a coherent set of analyses both on chemical element composition and lead isotopes or by isolated analysis that can't result from a mixture of other sources previously identified by other archaeological contemporaries objects. We have established assumptions for copper sources which suggest, by combining analytical data, metal type and other archaeological disciplines, a scenario for human peopling history between 2700 and 1600 BC.

Through this research, we contribute to a better understanding of Neolithic, Bell Beaker and Early Bronze Age peopling history in the Alps. We have done so by preparing a state of the art in metal findings on the Alpine area and establishing a reference set of analytical data of lead isotopic composition and chemical element composition for objects in western Switzerland. As to the Bell Beaker enigma, it shows one again its complexity.

Forthcoming Meetings and Conferences

The *Historical Metallurgy Society Annual General Meeting* will be held May 21-23, 2010, at the Castle Head field centre, Grange over Sands, Cumbria. Information on registration and a preliminary program can be found at <http://www.hist-met.org/hmsagm2010flyer.pdf>.

Accidental and Experimental Archaeometallurgy, the Historical Metallurgy Society Annual Conference, will be held September 2-3, 2010 at West Dean College, which is near Chichester in West Sussex, England. More information about registering for the event and other details can be found by visiting the following website: <http://www.hist-met.org/conf2010.html>. The lectures will be held in the College and the experiments will take place on adjacent college land.

The first session on the morning of Thursday September 2nd will comprise a series of lectures on general aspects of experimental archaeometallurgy. The second session, Thursday afternoon, will comprise archaeometallurgical experiments. The third session on the morning of Friday September 3rd will provide further archaeometallurgical experiments. The fourth and final session on Friday afternoon will comprise a final series of lectures on general aspects of experimental archaeometallurgy. Scheduled lectures, at this time, include "The Application of Metallography to Experimental Ancient Metallurgy: A Review" (David Scott), "Experiments in Metallurgy in Archaeology: The work of Professor R.F. Tylecote" (John Merkel), "The sword as 'serpent': does pattern-welding make Anglo-Saxon swords stronger?" (Thomas Birch), "Locating Value in Experimental Practices" (Roger Doonan), "Experimental Archaeometallurgy: hypothesis testing, happy accidents and theatrical performances" (David Dungworth), and "Experiments in Assaying" (Joseph Gauthier), while other potential speakers include Peter Crew, Gerry McDonnell, Jill Hari, and Aurélie Azéma *et al.* Archaeometallurgical experiments to be conducted nearby include "Making cast iron in a shaft furnace" (Gerry McDonnell), "Producing iron in a 'bowl' furnace" (David Dungworth), and "Smelting mixed copper carbonate/oxidised sulphide ore" (Simon Timberlake), while other potential experiments may be conducted by Skip Williams and Lee Sauder, Jake Keen, Tim Smith *et al.*, and Roger Doonan.

Previous Meetings and Conferences

The *75th Anniversary Meeting of the Society for American Archaeology* was recently held in St. Louis, Missouri from April 14-18, 2010. A number of posters and presentations with themes relating to metallurgy and metal-bearing minerals were presented. These included "Ground Stone, Metallurgy and Embedded Specialization on the Southern Northwest Coast" (Ames, Kenneth, Cameron Smith), "Materials Science Analysis of Copper Artifacts from Cahokia's Mound 34" (Chastain, Matthew, Alix Deymier, David Dunand, James Brown), "Prehistoric Copper on the Northwest Coast" (H. Cooper, Nicholas Waber), "Riveting Technology!" (Kim Cullen Cobb), "Lead Tesserae and the Roman Economy or How I Stopped Worrying and Learned to Love Lead Tokens" (William Dalzell), "Traces of the Trade: Bronze Age Metal Producers in the Eurasian Steppes Determined Through Skeletal Trace Metals" (John Dudgeon, David Peterson, Monica Tromp), "Trends and locations for Bronze Age crafting in the Lower Körös Basin" (Paul Duffy), "The Protohistoric Copper-base Metal Industry from New Lenox" (Kathleen Ehrhardt), "Transmissions and Transformations in Protohistoric Baja California: Copper-Based Metals from Laguna Guerrero Negro" (Thomas Fenn, Eric W. Ritter, John T. Chesley, Joaquin Ruiz), "Costa Rica Metallurgy: Local Productions and Social Networks Established with CR, Panamá and Nicaragua" (Patricia Fernandez), "Crafting Culture at Fort St. Joseph: An Examination of Labor Organization through a Technological Investigation of Tinkling Cones" (Brock Giordano, Michael Nassaney), "Sourcing Poverty Point Copper: Testing the Lake Superior Hypothesis using LA-ICPMS Analysis" (Mark Hill,

Diana Greenlee, Hector Neff), “Mineralogical and Compositional Analysis of Geologic Sources for Cultural Turquoise in New Mexico” (Cynthia Hotujec), “Fingerprinting Turquoise Deposits in the American Southwest” (Sharon Hull, Joan Mathien, Mostafa Fayek), “The “Chaîne opératoire” of Mesoamerican Metallurgy” (Blanca Maldonado), “Culture Continuity and Change from Formative through Tiwanaku Times at Pirque Alto” (Timothy McAndrews), “Industry and Innovation: Archaeological Investigations of a 19th-Century Brass Foundry” (Michael Meyer), “Bronze Age Metallurgy in the Eastern Carpathian Basin” (Christopher Papalas), “Molding Identity at Mayapan: The Multifaceted Uses of Metal at an Urban Center” (Elizabeth Paris), “The Disposal of Heirlooms and the End of Memory at the Lake Jackson Site” (Claudine Payne), “Magistral del Oro: A Seventeenth Century Mining Town in Northern Durango” (Maria del Roble Rios Ortega), “Adaptations of a Blacksmith: Maintaining European Expansion and Economic Growth on the North American Fur Trade Frontier” (Amy Roache-Fedchenko), “The Iron Age of America: Learning Metalworking in the New England Frontier” (Krysta Ryzewski), “Supply, Trade, and Conflict on the Colonial Frontier: Aspects of French, Spanish, and Native Interaction as Revealed by a Lead Isotope Analysis of Artifacts from Nine Eighteenth-Century Colonial-Era Sites within Texas and Oklahoma” (Steven Schooler), “Complementary Crafts: Metallurgy, Potting and Inter-Regional Trade in Banda, Ghana” (Ann Stahl), “Least-Cost Path and Viewshed Analysis of Copper Trade Routes in Late Bronze Age Cyprus” (Rhian Stotts), “Following the Coronado Trail through Artifact-Based Lead Isotope Analysis” (Alyson Thibodeau, Joaquin Ruiz, John T. Chesley), “Early Colonial Resource Appropriation: Sourcing Copper and Lead Ores from the Seventeenth Century Metallurgical Workshop at LA 162, Bernalillo County, New Mexico” (Noah Thomas, Alyson Thibodeau), “Technological Diversity and Stagnation: The Political Economy of Small-scale Silver Production in the Southern Andes” (Mary Van Buren, Claire Cohen), and “Slavery, Mining and Interaction in Colonial New Mexico” (David Vaughan). Abstracts for these papers and more can be found at: <http://saa.org/Portals/0/abstracts.pdf>.

The **Historical Metallurgy Society Spring Meeting: Early Scottish Metallurgy** was held March 20, 2010, at the National Museum of Scotland, Edinburgh. Speakers and presentations given at this meeting included “*South Scottish mines / Tonderghie*” (J. Pickin), “*Heavy metal pollution signatures*” (Tim Mighall), “*Lanarkshire lead smelting*” (T. Ward), “*Culduthel – the site*” (R. Murray), “*Culduthel – the slag and iron*” (D. Dungworth), “*Mid Ross Iron Age furnaces*” (G. McGregor, D. Seddon), “*Late Bronze Age moulds*” (T. Cowie), “*Metalworking ceramics*” (D. Sahlén), “*Recent National Museum of Scotland work on Roman and Early Historic silver (or possibly something on Mine Howe)*” (J. Tate, L. Troalen, M. Goldberg, A. Blackwell), “*Mine Howe and Scatness*” (G. McDonnell), “*Moulds and crucibles (possibly Mine Howe or Tarbat)*” (A. Heald), and “*Birnie or Traprain?*” (F. Hunter).

BIOARCHAEOLOGY

Gordon F.M. Rakita, Associate Editor

Strange Anti-Science Bedfellows

In recent months, several converging experiences have crystallized in my mind some ironic observations. In the first quarter of 2010, I have: been reading Richards Dawkin’s *The Greatest Show on Earth* (Free Press, 2009), repeatedly come across Ben Stein’s movie *Expelled* on various cable channels, read an article by Robert Pennock (2010) on the postmodern philosophical underpinnings of the intelligent design movement, and had a recent engagement with post-modern critiques of four-field anthropology (Segal & Yanagisako 2005; see also Schultz 2009). I do not propose to review in depth each of these works here. However, having these experiences has made me keenly aware of the commonalities between the critiques of evolutionary theory offered by creationists and many radical postmodernist scholars (a similar argument was made by Cartmill [1998]).

How is all of this relevant to Bioarchaeology and the members of the *Society for Archaeological Sciences*? First and foremost, both the creationist and postmodern movements make the rejection of scientific claims and evolutionary science itself a part of their primary goals. For those of us who take part in the scientific enterprise or who teach science, such attacks offer constant distractions and distortions. Moreover, as a discipline with strong links to biological evolution, bioarchaeology often finds itself on the front lines of these anti-evolution attacks. Finally, as Pennock (2010) and others (e.g. Berkman et al. 2008; Hawley et al 2010; Jakobi 2010) have noted, the level of public understanding of the scientific enterprise generally, and evolutionary science specifically, are abysmal. Within this context of ignorance, postmodern and creationist critiques of evolutionary science often gain traction. Recognizing the commonalities between the arguments of these two camps will hopefully assist SAS members mount effective defenses of what we do as scientists.

So what are the common arguments posed by radical post-modernists and creationists? Here are several:

- **Evolution is Social Darwinism.** This assertion is made from both camps, and I suspect the misunderstanding underlying it is derived from ignorance about the history of the field and a lack of careful reading. Basically the idea is that evolutionary science inevitably leads one to the Social Darwinist views of humanity espoused by Herbert Spencer (Isaak 2007: 3; Yanagisako 2005:80). In the extreme case, some even argue that Evolutionary thought led directly to Hitler’s Final Solution. As Leslie White pointed out over 50 years ago (White 1959), Spencer’s approach was not derived from Darwin’s theory. Certainly some individuals believe in both evolution and social Darwinist views, but the latter does not always follow from the former.
- **Evolution leads to Immorality.** For creationists, morality derives from God’s law; without God, there is no moral code

(Isaak 2007: 1). For their part, post-modernists assume that all Evolutionists fall into the naturalist fallacy of thinking that because something is “natural” then it is “good” or “right”. Indeed, some post-modernists (Yanagisako 2005: 80) have gone so far as to claim that because of this, evolutionary approaches to humans are racist. Both camps ultimately assume that Evolutionary thinkers are morally bankrupt. Obviously, the ethical codes of a wide range of professional scientific associations and the immoral acts of believers and post-modernists alike contradict the claim that evolutionists are unethical and creationists and post-modernists behave morally.

- **Evolution assumes that all change is random.** For creationists, this is the classic tornado in a junkyard argument that contends that it is highly unlikely that an airplane will be built by a tornado moving through a junkyard of airplane parts. The Post-Modern equivalent is the typical argument that cultures do not change randomly. These misunderstandings stem from an imprecise reading of evolutionary thought. Evolutionists do not claim that variation in species or cultures is random; only that it is random in regards to selection. Obviously, as Gould (1986) indicated, history matters. In this regard, evolutionary change is stochastic in nature. Conditions at one time are predicated on conditions at a previous time.
- **Evolution does not explain everything.** Creationists are fond of pointing out that Evolutionary theory offers no explanation for the origin of life on the planet. Post-modernists argue that Evolutionary theory has nothing relevant to say about modern human behavior (Yanagisako 2005: 93). Since evolutionary theory does not explain everything, then it must either be worthless or explain nothing. Clearly this is a ludicrous objection. Marx’s theory of the dialectic and his method of dissecting capitalist economies are incredibly useful, yet it provides no insight into gravity. Newtonian physics is helpful in understanding gravity, but provides no explanation for how an individual’s control over the mode of production is tied to their control of the means of production. This isn’t a matter of throwing the baby out with the bathwater; it’s akin to arguing that you shouldn’t give the baby a bath because the bathwater won’t cut his hair.
- **Evolution denies human spirituality and agency.** Both creationists and post-modern scholars seem frightened by the idea that humanity will be firmly united with the natural world. Both camps fear that Evolutionary approaches to humans will lead to biological reductionism or determinism that will result in a view of humanity as no different from the other animals (and plants). Creationists fear that acceptance of Evolution will lead to a denial of a divinely derived soul, a special connection to the creator, and the elevation of man above nature. Post-modernists worry that acceptance of Evolution will lead to a rejection of human agency. In both cases, there appears to be a need for humans to in some way be special or different. Both viewpoints seem unwilling to see humans as simply a part of nature, but rather insist that humans are in some way above or aloof from nature. Yet, viewing humans as intimately a part of nature has its own

value. As has been so often cited, “There is grandeur in this [Evolutionary] view of life” (Darwin 1958:459).

Obviously, not all post-modern scholars or all creationists agree with these criticisms of Evolution. I have presented a view of radical post-modernism and radical creationism. Yet we on the front lines are confronted by these viewpoints regularly. Those in academia in particular often confront one version (the creationist) in our classrooms, only to have to face the other (the post-modern) in faculty meetings. The consistency and consonance of their criticisms is ironic. Anti-science certainly makes for strange bedfellows.

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BOOK REVIEW

Tibes: People, Power and Ritual at the Center of the Cosmos.

L. Antonio Curet and Lisa M. Stringer, editors. University of Alabama Press, Tuscaloosa: 2010. ix+ 329 pp., 41 figures, 33 tables, index. Price US\$53 (cloth). ISBN: 978-0-8173-1686-0.

Reviewed by Laurimar Garcia, Department of Anthropology, University of Notre Dame, Notre Dame, IN 46556, USA.

Tibes: People, Power and Ritual at the Center of the Cosmos is the culmination of over a decade of excavation, analysis and data collection from the ceremonial site of Tibes in Puerto Rico. This book is unique in that it comprises an amalgam of multidisciplinary contributions that have all pushed the boundaries of conventional research and used cutting edge investigative techniques to better accomplish archaeology in the Caribbean. Each of the contributing authors has provided a re-examination of what is known from initial results of excavations in Puerto Rico to help inform about the formation and change of social complexity at centers such as Tibes. The scholars argue that there are many problems with using cultural models for reconstructing social complexity in the Caribbean. They pose a counter model that focuses on how the individual, households and small groups affected change and reproduced their culture to transform their social environment. By combining results from paleoethnobotany, zooarchaeology, geophysical surveying, paleolithography, and osteology, *Tibes* provides a well rounded approach to comprehending Tibes as a ceremonial site and how future research could be enhanced.

“Introduction” by L. Antonio Curet and Lisa M. Stringer. This section is a review of the site’s history, as well as noting the problems with previous research models. Beginning in the introduction and mentioned throughout the book, Irving Rouse’s chronology of Caribbean settlement based on ceramics is used as the default for determining time periods, albeit somewhat reluctantly. The authors don’t believe that using data at the cultural level to inform about human behavior is the most effective technique. The crux of this study is to see how individuals “negotiate and renegotiate with other segments of society to be able to accomplish specific social goals” (pg. 5). To this end, households are the most effective arena for determining how these goals are achieved.

Chapter 2 by Pedro Alvarado Zayas and L. Antonio Curet, “Tibes: History and First Archaeological Work.” This chapter is a more detailed description of the site’s construction and structures, summary from early investigators, and information on cultural and environmental processes that took place to shape Tibes as a ceremonial center. It is in this chapter that the authors reveal the gaps that the initial research in the 1970s did not address. Questions regarding abandonment, mortuary practices, and changes in ceramic style are hoped to be answered with the results of a more systematic approach to excavation (pg. 37).

Chapter 3 by L. Antonio Curet, “*The Archaeological Project of the Ceremonial Center of Tibes.*” Curet takes the time to

outline the parameters and new methodologies that were employed at Tibes. Due to the principle intention to focus on identifying household structures, geophysical surveying was utilized intensively and executed in multiple phases (see Chapter 4). Extensive excavation of anomalies as defined by the results of electric resistivity, ground penetrating radar (GPR), and magnetic gradiometry demonstrated the efficacy of these techniques in identifying possible household structures. Considering the ephemeral quality of household floors and structures in the Caribbean, the success at Tibes is a testament to the potential the combination of these surveys has for better data result in prehistoric sites.

Chapter 4 by Daniel Welch, “Geophysical Prospection at the Ceremonial Site of Tibes, 1998-2001.” This chapter is a thorough explanation of the results from the two-fold geophysical surveys that took place first in 1998 with electric resistivity followed by magnetic gradiometry, electrical resistivity and GPR in 2001. Detecting household features and structures proved to be difficult, but these surveys accompanied with shovel test pits and on site computer analysis demonstrated the value of using multiple techniques in discovering structures that gave weak readings. The most important aspect of these tests is that they proved a need for “ground truth calibration of data” that enables researchers to verify the effectiveness of their results on site. Although the results from Welch’s tests did help in the overall understanding of possible households and activity areas in the site, further work is necessary to fine tune the calibration of equipment.

Chapter 5 by Lee A. Newsom, “Paleoethnobotanical Research at Tibes.” Newsom’s analysis focuses on identifying how the flora and fauna of Tibes contributed to the development of this site as a complex society and ceremonial center. The role of agriculture, imported crops, staples, domesticated vs. wild foodstuffs as well as possible control and access by elites are only a few of the topics addressed. Newsom has been able to identify specific plants used for sustenance (*Bourreria*), ritual (*Oenothera*), as well as discover that in the areas demarcated as households, the paleodiet was most likely reliant on a “opportunistic collection” of wild fauna and “managed fruit trees” (pg. 111). The data provides successful insight into how the ancient ethnobotany at Tibes was employed in household economics, as sources for fuel, and materials for construction. More importantly, Newsom thoroughly catalogues the 35 taxa found at Tibes, creating a foundation for further investigation of activity areas based on the location, possible use, source, and frequency of the documented archaeobotany.

Chapter 6 by Susan D. de France, Carla S. Hadden, Michelle J. LeFebvre, and Geoffrey DuChemin, “Animal Use at the Tibes Ceremonial Center.” The authors in this chapter have documented faunal habitat and use, as well as the subsequent changes in these resources at Tibes. Furthermore, they have used evidence from spatial distribution to elucidate the possibility of certain animals such as guinea pigs as being attributed to consumption based on hierarchy (pg. 136). Although their research has made strides in the way of diachronic analysis at this ceremonial site, supplementary excavations should be performed to inform about social

meaning of the faunal assemblage in a household environment. These authors have taken great care to explore the variability of the faunal refuse and have achieved a preliminary hypothesis that indicates no significant change in subsistence behavior due to the emergence and growth of social stratification.

Chapter 7 by Jeffery B. Walker, "Lithics from the Tibes Ceremonial Site." This chapter focuses on the stone artifacts excavated from the 1996-1999 field seasons. Walker uses this section to not only report on the origins of raw materials, lithic technology, and post production wear for the understanding of social complexity, but also creates his own inquiry on the quality of the lithic artifacts that were excavated. As seen in previous chapters, the Saladoid occupation seems to have richer archaeological material than the later Ostionoid occupation. Consequently, Walker investigates why the artifacts found were simple and mundane at a site that is a supposed, "premier ceremonial center" (pg. 152). He breaks down the possible reasons for this as being attributed to excavation technique, scarcity of material, prehistoric activity, or location of excavation units. As a refreshing inclusion to this book, he incorporates an additional analysis focusing on the presence of gender oriented lithic production. Walker mentions that the discrepancy in lithic material could be attributed to the location excavation units, seeing as the primary focus was on discovering household activity areas. He also provides great insight into the often debated topic of women lithic production by providing examples in Tibes where it could be argued that women were in control of bipolar reduction techniques while men were dominating those requiring direct freehand.

Chapter 8 by Scott Rice-Snow, Melissa J. Castor, Andrew K. Castor, Jeffry D. Grigsby, Richard H. Fluegeman, and L. Antonio Curet, "Boulder Lithology Survey at the Tibes Ceremonial Site." The most frequent archaeological material present in Tibes are the pebbles, stones, and boulders found throughout the site. The authors in the chapter enumerate the percent of stones that were collected from the Portuguese River, possible location of the stones that are not local to the area, in like manner, they speak on boulder selection for the structures at Tibes; posing the possibility of either nonrandom assembly of boulders on structures or changing availability of boulders in the river. Conclusions towards changes in lithology effected by social change are not explicitly addressed, but it could be speculated that as the social dynamic increased so did networking, thereby explaining the presence of the nonlocal calcareous sandstone boulders from two different parts of the island.

Chapter 9 by Edwin F. Crespo-Torres, "Ancient Bones Tell Stories." Extensive excavation of burials at Tibes was first performed by Juan Gonzalez Colon from 1975 to 1982; unfortunately poor preservation techniques caused pervasive postmortem fragmentation of 126 individuals. Crespo-Torres uses the information collected from these skeletons in conjunction with data from three other burial sites in Puerto Rico to create an osteobiographical profile based on distributions of height, age and pathological conditions. The lack of information such as provenience and context from Colon's earlier excavations prevented Crespo-Torres from

constructing a comprehensive study of funerary behavior or understanding diachronic and synchronic mortuary patterns. Hopefully future excavations will have the resources to perform systematic biological analysis and preserve human remains.

Chapter 10 by William Pestle, "Bone Chemistry and Paleodiet at the Ceremonial Center of Tibes." Pestle uses samples from Tibes, Paso del Indio, Punta Caldero, and Maruca and brilliantly demonstrates how using stable isotopes extracted from human remains is a successful technique for understanding the paleodiet. His results are very interesting if paired with those of Lee Newsom who used a more traditional approach to reconstructing diet. More importantly is Pestle's ability to contribute results to understanding social complexity on an individual level and not a familial, group or community level. This is by far one of the leading examples that elucidate how finding new methods of inquiry push the envelope and bring Caribbean archaeology to the forefront of academic investigation.

Chapter 11 by Joshua M. Torres, "Tibes and the Social Landscape." It is in this chapter that the importance of Tibes as a ceremonial center and the earliest example of social stratification is teased out. We return to Rouse's ceramic timeline to ground our interpretation of the relationships between individuals at Tibes and the surrounding communities. Torres expertly outlines the social networks that emerged in the different periods of occupation and compartmentalizes the results based on presence or absence of ceremonial features and domestic areas. His tentative results point to how Tibes was able to transform itself into a center for ceremonial, economic, and social interaction.

Chapter 12 by L. Antonio Curet and Joshua M. Torres, "Plazas, Bateys and Ceremonial Centers." In this book's concluding chapter we see the authors providing a synthesis of the contributions of the previous authors toward understanding social complexity in light of household economies. To better explain the issues contributing to the rise of social complexity in Tibes, Curet and Torres delineate the importance of the definition of what a ceremonial center consists of, regional dealings, time and scale, and differentiating between vacant vs. occupied. It requires one to think of ceremonial centers not only as a meeting place for ceremonies but the focal point for intraregional interaction (pg.269).

Overall, *Tibes: People, Power and Ritual at the Center of the Cosmos* contributes tremendously to our understanding of the Taíno people in Puerto Rico, but more importantly it illustrates how significant results can be if new approaches are used in conjunction with traditional methods. I believe this study was very comprehensive and accessible to people in all levels of academia. Those looking for new methods and a fresh look on conducting archaeology in the Caribbean will find *Tibes* an engaging model. The use of multidisciplinary specialists working on one project augmented the data and expertise at Tibes tenfold. In spite of this, questions regarding gender were not thoroughly addressed. Moreover, as discovered in Chapter 7, by focusing survey efforts only on identifying household features, other potential activity areas may have been

overlooked. All in all, *Tibes* is a valuable contribution to Caribbean Archaeology and has set a solid foundation for exploring the more novel approaches to similar studies in the Caribbean.

EMPLOYMENT POSITIONS, FELLOWSHIPS, AND RESEARCH OPPORTUNITIES

Postdoctoral Fellowships at University of Pittsburgh (Deadline: June 1, 2010). The University of Pittsburgh School of Arts and Sciences is now offering up to eight postdoctoral fellowships in the humanities and social sciences to begin in January 2011. The fellowships are for one year and are renewable for an additional year. Fellows will teach two courses per year, complete scholarly work, and participate in the academic and intellectual community of the School of Arts and Sciences and the Department with which they are affiliated. The annual stipend will be \$45,000. Applications are invited from qualified candidates in the humanities and social sciences who have received the PhD between December 1, 2007 and November 1, 2010. Applicants who do not have the PhD in hand at the time of application must provide a letter from the Department Chair or the Advisor stating that the PhD will be conferred before the term of the fellowship begins. Applications are due June 1, 2010. For more information visit www.as.pitt.edu/postdoc or email postdoc@as.pitt.edu. The University of Pittsburgh is an affirmative action, equal opportunity institution.

Applications are invited for one **PhD position** (four years fully funded) to join the ARCHGLASS team as part of a European Research Council Starting Grant research project, lead by prof. Patrick Degryse, in collaboration with international research groups. A PhD researcher is expected to carry out the subproject on the mineralogical and geochemical characterisation of flux mineral resources used in glass production. This scholar brings together information on possible flux resources used for Hellenistic-Roman glass production, and studies glass from the point of view of B isotopes (in co-operation with both post-doctoral fellows) to identify possible multiple sources of fluxes. A Ma or MSc degree in archaeometry, archaeological sciences or exact sciences (chemistry, physics, geology etc) is required. Experience in archaeological or archaeological sciences research is an advantage.

For the PhD position, written applications should be addressed to Prof. Patrick Degryse, Geology, Earth and Environmental Sciences, Katholieke Universiteit Leuven, Celestijnenlaan 200E, bus 2408, BE-3001 Leuven, Belgium, Patrick.Degryse@ees.kuleuven.be. Applications should include: a curriculum vitae, a letter of motivation, names for two academic references. The preferred start date is 1 October 2010.

Applications are invited for a **PhD studentship** within the Division of Archaeological, Geographical and Environmental

Sciences, University of Bradford, UK. The candidate will work as part of a multi-university, multi-disciplinary project called Detection of Archaeological Residues using remote sensing Techniques (DART), which will focus on analyzing the physical and environmental factors that influence archaeological residues' contrast dynamics with the overall aim of improving feature detection. The DART project consortium consists of 25 key heritage and industry organizations, academic consultants and researchers from the areas of computer vision, geophysics, remote sensing, knowledge engineering and soil science. The candidate will work closely with these partners and may be expected to spend periods of time at their institutions.

This PhD will combine research in geophysical data acquisition and analysis, and knowledge management. As part of this project the prototype of a decision tool will be developed that will help to evaluate and synthesize information from the overall project. This research will lay the foundations for the development of decision tools that link soil properties with remote sensing and geophysics data of the studied sites and their archaeological residues. Remote sensing information will be acquired as part of the overall project. The candidate for this PhD will collect geophysical measurements of earth resistance and GPR over the buried archaeological remains of the investigated sites. Direct comparison will be made between the hyperspectral data provided by remote sensing platforms and earth resistance area surveys to be collected for the test areas; and between in-situ soil data, and resistivity imaging (ERI) and GPR profiles around the location of the buried soil sensors.

Under AHRC funding rules, this studentship is only available to UK residents (as defined by AHRC rules: <http://tinyurl.com/ahrc-elegibility>). The stipend will be paid at current AHRC rates (£13290 in 2009/10) per annum for three years full-time and the project will also cover university PhD registration fees. Residents of other EU countries may apply, but are only eligible for the fees award -- they would need to have their own sources to cover their living expenses. To discuss this project further, please contact Dr Chris Gaffney (C.Gaffney@bradford.ac.uk), including your CV with the enquiry.

Research on burial conditions. A valuable and unexploited archive of archaeological information rests within soils associated with human remains. Burials have the potential to reveal signatures of body decay; pre-burial treatment and mortuary practice; clothing and perishable artefacts; diet; cause of death; disease and drug-use. A new (2009-2014) ERC funded project (InterArChive) headed by Prof. Don Brothwell, University of York, and involving Dr. Raimonda Usai and Dr. Brendan Keeley, University of York and Dr. Clare Wilson, University of Stirling aims to investigate the nature of this archive and to develop procedures for sampling and scientific analysis of archaeological human burials to maximise data recovery especially in situations where visual remains are no longer present. The new interdisciplinary approach that we develop and validate will provide a protocol for archaeological and forensic sampling and for the scientific analysis of archaeological and historical burials.

The project will involve both experimental pig burials and intensive sampling of archaeological burials in a range of soils across Europe and beyond. Samples will be analysed using a range of physical and chemical analyses providing measurements at macro-, micro and nano- scales. The novel combination of analytical techniques will include soil micromorphology of soils from the head, pelvis, hands and feet area of the body in combination with SEM-EDX and MALDI. Trace organic and elemental analysis will concentrate on soils from 17 points around the body as well as control samples from above and below the burial. This approach will reveal the extent and nature of the soils archive, in contrasting burial and soil conditions, that will help us to understand past cultural practices and environmental conditions.

The team are currently looking for grave sites covering a range of geological and climatic zones; we would be especially interested to hear about potential sites in arctic, Mediterranean and tropical climates as well as those on volcanic soils. Further information and contact details can be found through the projects webpages <http://www.york.ac.uk/archaeology/research/current-projects/interarchive/>

American Indian Program. The research collections housed in the US National Museum of Natural History offer enormous opportunities for research to students of Native American history and culture. The American Indian Program was established in 1986 to encourage participation of Native Americans in Smithsonian activities and to support collection research, exhibitions, and public programming as they relate to Native peoples. The program is particularly interested in collaborative projects with Indian-controlled museums, colleges, and other cultural and educational institutions but welcomes inquiries about research, exhibitions, and other outreach activities from all interested parties. The Program Director has supervised a number of graduate students in various fields. Internships and research grants are available from the Office of Fellowships and from the American Indian Program for work at the Museum under the direction of the Program Director.

Areas of study: American Indian history and culture as represented in the museum's collections and archives. Stipend: The program awards stipends to researchers working on projects sponsored by the American Indian Program and under the supervision of the Program Director. Term: Open. Deadline: None. Contact: JoAllyn Archambault, Department of Anthropology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0112 USA. Phone: (202) 357-4760; email: archambj@si.edu.

Latino Museum Studies Program (LMSP). Organized by the Smithsonian Latino Center (SLC), the Latino Museum Studies Program (LMSP) was established in 1994 to increase the representation, documentation, knowledge and interpretation of Latino art, culture, and history. The program includes a two-week seminar designed to provide participants with the tools to enhance their leadership, research, and creative skills through a series of lectures, workshops and hands-on experiences at the

Smithsonian Institution, as well as other research facilities within the Washington, D.C. metropolitan area. The second half of the program includes a team project which provides practical experience in different areas of museum work such as collecting initiatives, museum-based curriculum development, curatorial work, and on-line education initiatives. All participants are required to work on a final project and complete all four weeks of the program.

Fifteen mid-career museum professionals and graduate students are selected from a nationwide pool of applicants. Participation is free and includes the cost of round-trip travel to Washington, D.C. and housing accommodations for the duration of the four-week program. Contact: Smithsonian Latino Center, Smithsonian Institution, P.O. Box 37012, MRC 448, Washington, DC 20013-7012 USA. Phone: (202) 633-1240; email: latinoconference@si.edu

UPCOMING CONFERENCES

Rachel S. Popelka-Filcoff, Associate Editor

2010

24-26 May. Youth in Conservation of Cultural Heritage (YOCOCU 2010), Palermo, Italy. General information: <http://www.yococu.com/>

6-11 June. 2010 SEA-CSSJ-CMS Trilateral Meeting on Clays. Madrid, Spain. General information: <http://www.sea-arcillas.es/2010TMC/>

12-18 June. Goldschmidt 2010 - "Earth, Energy and Environment". Knoxville, TN, USA. General information: <http://www.goldschmidt2010.org/>

21-25 June. XIII International Conference on Ground Penetrating Radar. Lecce, Italy. General information: <http://www.ibam.cnr.it/gpr2010/>

28 June- 2 July. GeoRaman 2010- 9th International Conference on Raman Spectroscopy. Sydney, Australia. General information: <http://georaman2010.com/default.html>

24-28 July. 2nd International Sclerochronology Conference, ISC2010, Mainz, Germany. General information: <http://www.paleontology.uni-mainz.de/ISC2010/>

1-6 August. 19th World Congress of Soil Science. Brisbane, Australia. General information: <http://www.ccm.com.au/soil/>

2-6 August. 59th Annual Denver X-ray Conference. Denver, CO, USA. General information: <http://www.dxcicdd.com/>

8-13 August. The Meeting of the Americas. Foz Do Iguassu, Brazil. Special Session GP11: Modern Magnetic and Other Physical Techniques Applied to Archaeology and Anthropology. General information: <http://www.agu.org/meetings/ja10/program/index.php>

21-27 August. 20th General Meeting of the International Mineralogical Association. Budapest, Hungary. General information: <http://www.ima2010.org/>

22-26 August. 238th National Meeting and Exposition, American Chemical Society. Boston, MA, USA. General information: <http://www.acs.org>.

23-28 August. 11th International Conference, International Council for Archaeozoology, Paris. France. General information: <http://www.alexandriaarchive.org/icaaz/ICAZ2010/ICAZ%202010%20-%20home%20page.htm>

7-11 September. Fourth International Symposium on Biomolecular Archaeology. Copenhagen, Denmark. Abstract deadline: May 1 2010. General information: <http://www.isba4.net/index.php>

16-19 September. AIMA 2010 Conference: Perceptions and Misconceptions of Maritime Heritage: accuracy and impact in the public domain, Melbourne, Australia. Call for session proposals due April 30th 2010. General information: <http://www.heritage.vic.gov.au/Maritime/AIMA2010.aspx>

16-18 September. International Aerial Archaeology Conference, AARG 2010. Bucharest, Romania. General information: <http://www.univie.ac.at/aarg/php/cms/>

19-24 September. 7th International Microscopy Congress (IMC17), Rio de Janeiro, Brazil. Special session: Symposium on Materials in Archaeology and Cultural Heritage (S-M20). General information: <http://www.imc-17.com/>

23-26 September. XIX Congress of the Carpathian Balkan Geological Association, Thessaloniki, Greece. General information: <http://www.cbga2010.org/>

26 September- 1 October. 18th International Sedimentological Congress (ISC), Mendoza, Argentina. Special session on Palaeoceanography. Contact information: Tom Stevens Thomas.Stevens@rhul.ac.uk General information: <http://www.isc2010.com.ar/english/home.html>

6-9 October. Plains Conference. Bismarck, ND, USA. General information: <http://www.ou.edu/cas/archsur/plainsanth/meeting/meeting.htm>

31 October- 3 November. The Geological Society of America National Meeting. Portland, OR, USA "Reaching New Peaks in Geoscience". General information: <http://www.geosociety.org/meetings/>

7-10 November. SR2A: Synchrotron Radiation in Art and Archaeology. Amsterdam, The Netherlands. General information: <http://www.sr2a.ua.ac.be/>

17-20 November. American Schools of Oriental Research Annual Meeting. Atlanta, GA, USA. General information: <http://www.asor.org/am/index.html>

1-3 December. Association for Environmental Archaeology (AEA) Annual Conference, Kyoto, Japan. General information: <http://www.envarch.net/events/index.html#Kyoto>

2011

5-9 January. Society for Historic Archaeology Conference on Historical and Underwater Archaeology, Austin, TX, USA. General information: <http://www.sha.org/>

6-9 January. 112th Joint AIA/APA Annual Meeting. Austin, TX, USA. General information: <http://www.archaeological.org/webinfo.php?page=10096>

7-11 January. 5th International Biogeography Society Meeting, Crete. General information: <http://www.biogeography.org/html/Meetings/index.html>

20-25 March. Twelfth International Conference on Accelerator Mass Spectrometry, Wellington, New Zealand at the Museum of New Zealand, Te Papa Tongarewa. General information: <http://www.gns.cri.nz/ams12/>. Abstract deadline: 15 December 2010

27-31 March. 241st ACS National Meeting and Exposition, Anaheim, CA, USA. General information: <http://acs.org>

13-18 March. Modern Trends in Activation Analysis, College Station, TX, U.S.A. Special session on Archaeometry. General information: <http://tti.tamu.edu/conferences/mtaa13/>

30 March- 3 April. Society for American Archaeology 76th Annual Meeting. Sacramento, CA, USA. General information: <http://www.saa.org/meetings/index.html>, Contact: meetings@saa.org

3-6 April. Qin Period Metallurgy and its Social and Archaeological Context. Xian, China. General information: <http://www.ucl.ac.uk/silva/archaeology/events/conference/qinmetallurgy2010>

April. American Association of Physical Anthropologists Annual Meeting. Minneapolis, MN, USA. General information: <http://physanth.org/annmeet/>

April. Paleoanthropology Society Meetings, held in conjunction with the American Association of Physical Anthropologists. Minneapolis, MN, USA. General information: <http://www.paleoanthro.org/meeting.htm>

14-19 August. Goldschmidt 2011. Prague, Czech Republic

22-26 August. 238th National Meeting and Exposition, American Chemical Society. Boston, MA, USA. General information: <http://www.acs.org>.

2012

34th International Geological Congress. Brisbane, Australia <http://www.34igc.org/>

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