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IN THE HEAT OF THE MOMENT

According to the masthead, this is the fall issue of the *Bulletin*, but the thermometer in my car says otherwise. In this part of the world, the heat index has passed triple digits and shows little sign of slowing down. The conditions certainly concentrate one's attention to just how much fieldwork must be done with respect to the amount of shade available.

The heat is on within the pages of this newsletter as well. First, I hope that you have noticed the amount of information within these pages that references material available on the Internet. In an effort to keep you up-to-date, the *Bulletin* has moved beyond the paper version mailed to your home or office. It is also accessible immediately through the SAS website found at <http://www.socarchsci.org/>. The advantage to offering a digital copy of the *Bulletin* is that you can now click on the hot links appearing as underlined text throughout the sections. No longer do you need to bring the *Bulletin* to your computer and meticulously type in the long web address. Instead, bookmark the SAS home page and let the hot link do the work for you.

Other hot topics in these pages include Gordon Rakita's opinion piece on the current debate regarding work done by Stephen Jay Gould on the introduction of bias in science. Several books hot off the presses are also reviewed, and Tom Fenn asks readers to turn up the heat on a Chinese mining company that threatens the archaeological significance at Mess Aynak. Find these and more burning issues within.

Jay VanderVeen, Editor-in-Chief

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ANNOUNCEMENTS

Call for Papers

2011 Developing International Geoarchaeology Conference. The University of Tennessee's Archaeological Research Laboratory and the Department of Anthropology will be hosting the 2011 Developing International Geoarchaeology (DIG) conference in Knoxville, Tennessee from September 20 to the 24 2011. This includes a field trip based workshop held September 20, 21, and 22 and general session held September 23 and 24.

The conference blends archaeological topics, such as land use practices, human-environmental interactions, landscape reconstruction, site formation processes, and trade and exchange, with geoscience and environmental based topics, such as geomorphology soil science, sedimentology, petrography, paleobotany, and archaeometry.

Online registration, abstract submission, detailed conference information, and travel information is now available at: www.digknoxville.com

Travel assistance is available for conference presenters from non-Western countries through a Wenner-Gren Conference Grant. Limited funding may also be available for attendees from Europe and Canada. In order to apply, you must submit a 500 word abstract for either a podium or poster presentation.

Any questions can either be sent to Calla McNamee at callamcneee@gmail.com or to Howard Cyr at hcyr@utk.edu.

Call for Associate Editor

Speaking of geoarchaeology, the *SAS Bulletin*, this fine newsletter you are holding in your hand (or now conveniently viewing on the screen at <http://www.socarchsci.org/sasb.html>), is seeking an individual to serve as *Associate Editor for Geoarchaeology*. Responsibilities include soliciting articles, delegating short reviews of books and articles, bringing attention to previous and forthcoming meetings, and generally letting the membership know what is going on with all things geoarchaeological. Contact Jay VanderVeen at jmvander@iusb.edu if you are interested in learning more about the position.

PREDICTIVE MODELLING OF THE BURIED ARCHAEOLOGY OF AGGREGATE BEARING LANDSCAPES

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Introduction

With the increasing commercial costs of archaeological investigation in aggregate bearing landscapes and the demonstrable archaeological wealth of these environments (Needham and Macklin, 1992; Needham, 2000; Sidell *et al.*, 2000), greater emphasis than ever is being placed by regional and national heritage managers in England and other parts of the UK on the collation, interrogation and interpretation of both published and unpublished archaeological datasets, to allow the characteristics of any landscape to be assessed and to inform management decisions (Bishop, 2003).

Understanding the character and distribution of the archaeological resource engendered by a comprehensive characterisation exercise carries with it the potential to predict the likelihood of encountering archaeological deposits. The risk of encountering such archaeological remains and the types of remains likely to be encountered are questions of considerable importance to the minerals industry, since they will directly affect extraction costs, and to heritage professionals when designing the most appropriate mitigation strategies for their clients in response to archaeological planning briefs. However, despite this context and the demonstrable threats to aggregate related archaeology (Darvill and Fulton, 1998; French, 2004), little attempt has been made by the archaeological community in the UK to construct landscape-scale predictive models.

This short report summarises research, funded by English Heritage through the Aggregates Levy Sustainability Fund, and undertaken by the Institute of Archaeology and Antiquity at the University of Birmingham to explore methodologies for creating predictive models of the geoarchaeological potential of the aggregate bearing landscape of the Trent Valley, in the midlands of England. The Trent is Britain's fifth longest river, draining a catchment of some 10,452 km², and is responsible for approximately 20% of the UK's annual sand and gravel aggregate production. It has a rich, well documented archaeological resource, which sits within a complex and equally well documented geoarchaeological setting. As such

it serves as a useful exemplar for other lowland river systems in the British Isles.

Objectives and Methods

Predictive models seek to determine the probability of a particular phenomenon (for example, an archaeological site of a particular type) occurring at an unsampled location based on a quantitative assessment of the location characteristics of known examples of the same. Typically, such models rely on a four step process, from data collection through statistical analysis, model application and validation, and the application of complex statistics. The analysis and generation of landscape-scale predictive models has been greatly simplified by the application of computer-based Geographical Information Systems (GIS). However, in general there has been an ambivalent attitude amongst archaeological practitioners and academics in the UK to the development of predictive models. Reasons for this ambivalence are manifold, but often focus on the essentially environmental deterministic nature of predictive models and are typified by the view of Gaffney and Van Leusen (1995) who caution that the reliance on such models may actually create an unacceptable potential for the destruction of cultural heritage. Key academic texts skirt the issue of predictive modelling (e.g. Wheatley and Gillings, 2002) although a number of recent studies have demonstrated useful applications in a variety of domains and Connolly and Lake (2006) assert their usefulness at least in the field of cultural resource management.

We suggest that more inductive approaches to predictive modelling, rather than simply the distribution of a particular class of site, typified for example by the whole landscape approach of historic landscape characterisation (e.g. Clark *et al.*, 2004) prove more profitable in the extensively researched and densely settled aggregate bearing landscapes of lowland Britain. Fortunately, the field of geoarchaeological landscape assessment has seen a number of useful recent studies adopting such inductive, landscape focused approaches. For example in the UK and USA, relatively small reaches of Holocene valley floor have been zoned into areas of varying archaeological potential on the basis of their geomorphic evolution (Bettis and Mandel, 2002; Passmore *et al.*, 2002; Stafford and Creasman, 2002). In the Trent Valley Yorke (*et al.*, 2004) devised a simple predictive map for the valley floor based on an analysis of drift geology. More recently, a significant advance has been made by Ward *et al.* (2009) who have demonstrated the value of mapping the physical and chemical characteristics of soil as an index of archaeological preservation potential across the British Isles.

The work described here builds on the concepts of Ward *et al.* (2009) to explore more broadly cultural heritage and geoarchaeological context. The overall aim of the research has been to devise a robust, repeatable methodology for

quantifying the likely presence (and hence the potential economic consequences) of anthropogenic and environmental archaeological remains.

Modelling was carried out using the raster data model and the spatial modelling and analysis tools provided by ESRI's ArcGIS (version 9.3). Models were constructed from a sequence raster layers representing data from existing archives, such as soil type, drift geology, known archaeology, data from regional geoarchaeological surveys, such as palaeochannels mapped from aerial imagery, and constructed layers such as thickness of alluvial deposits, derived from assessment of borehole records by project personnel. Each raster cell in the input layers was assigned a weight on an integer scale between 1 (low) and 10 (high) based on a range of factors. Once weights were assigned, analytical and predictive models were generated by a simple arithmetical process. For each cell within the overall raster model the sum value of all weights derived from each raster layer was calculated and assigned to a new raster layer. These sum weights were then reclassified to a simple five point scale (1=low 5=high) by examining the statistical properties of the entire dataset and dividing the sum scores into quartile ranges. Very high values (above the 95th percentile) scored 5 and very low values below the 5th percentile) scored 1, the lower quartile scored 2 and the upper quartile 4 and the middle quartiles (between 25 and 75%) 3.

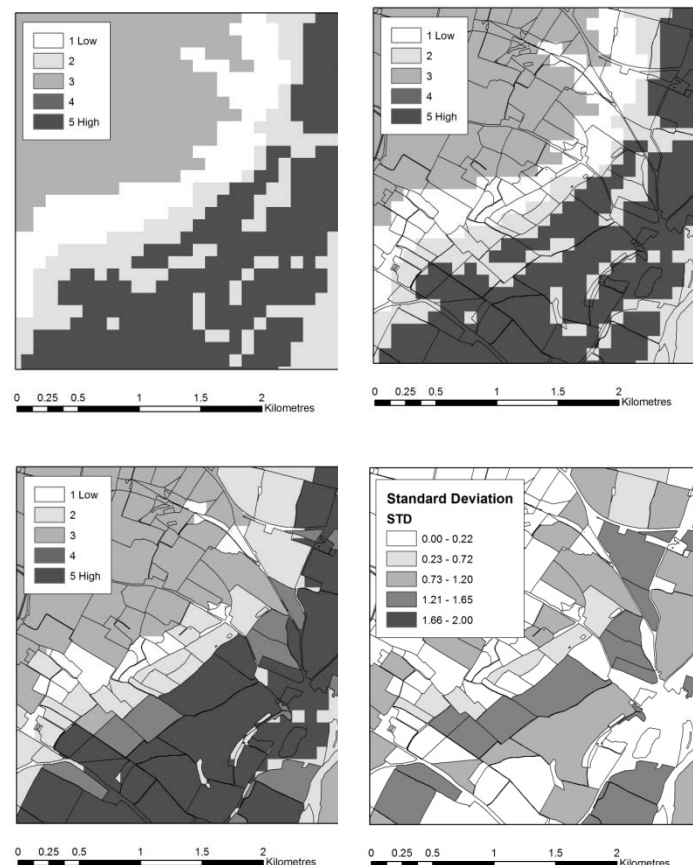
In addition to 50m continuous raster data, models were processed to provide output at the resolution of individual land parcels (as mapped by the Ordnance Survey) as it is felt that this provided the most useful real-world spatial framework for querying underlying spatial models. The output from raster models was devolved back land parcel polygons by generating neighbourhood statistical summaries of raster model values using the Ordnance Survey Master-Map topography layer as the template for neighbourhood polygons (excluding built up areas and land parcels less than 1ha in extent). Since a single land parcel, particularly a large one may take in a significant number of 50m square cells from the original raster data, which in turn may display a considerable range of values, the variation within source raster data within a single land parcel was visualised by mapping the standard deviation as a convenient index of that variation.

Discussion

The completed research generated period based predictive models of archaeological potential for each study area. In addition we produced models of predicted presence of waterlogged organic deposits. Further models (not discussed here) considered the likely significance of predicted remains by period and the predicted effectiveness of field investigation and prospection techniques. In general, our models highlight the essentially geologically

determined bias of the chosen approach, with the presence of mapped river terrace in particular acting to elevate archaeological potential in almost all periods. The models of the preservation potential for organic water logged remains are rooted firmly in variations in drift geology, but since this is not an unreasonable assumption, we feel that these models, fusing as they do geology, mapping of palaeochannels and observations from boreholes, produce a useful and realistic assessment of the varying preservation potential of the floodplain and terraces.

Predictive modelling of any sort, deductive or inductive, is always open to criticisms of determinism and the inherent bias contained in the precepts of each model. Notwithstanding, we feel our work has made an interesting contribution to debate on the usefulness of such approaches, particularly in landscape-focused paradigm of historic landscape characterisation, and we look forward to extending the methodology into other landscape types in future research.



Examples of model output in various guises, showing (top left) raster model output (top right) raster with MasterMap overlay (bottom left) model scores propagated to MasterMap using zonal statistics (bottom right) standard deviation.

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ARCHAEOLOGICAL CERAMICS

Charles C. Kolb, Associate Editor

The column in this issue includes six topics: 1) Must Reads; 2) Reviews of Books on Archaeological Ceramics; 3) Previous Meeting; 4) Forthcoming Meeting, 5) Exhibitions and Symposium; 6) Online Resource.

Must Reads

Dean E. Arnold (Wheaton College, IL, USA) “Classics Review: *Ceramic Theory and Cultural Process* after 25 Years” in *Ethnoarchaeology: Journal of Archaeological, Ethnographic, and Experimental Studies* 3(1):63-98 (2011) accompanied by Karen Harry’s (University of Nevada, Las Vegas, USA) “Building Ceramic Theory: A Twenty-Five Year Retrospective on Dean Arnold’s Work” 3(1): page numbers not yet available. Arnold’s retrospective on how he came to write *Ceramic Theory and Cultural Process* is an insightful assessment of how this “classic” work on ceramics came to be researched, written, and published. Would that we had the authors of other major works in anthropology providing a behind the scenes review of the trials and tribulations of anthropological research. It is a major contribution to the history of anthropology (and science), historiography, and contribution that should be read by anyone preparing to write and publish a monograph or book derived from fieldwork and laboratory and archival analyses.

Book Reviews

A Dated Type Series of London Medieval Pottery: Part 5, Shelly-sandy Ware and the Greyware Industries, Lyn Blackmore and Jacqueline Pearce, MOLA Monograph 49, London: Museum of London Archaeology, 2010. xvii + 334 pp., 154 black-and-white and color illustrations, 31 tables, bibliography, index; ISBN-13: 978-1-901992-93-9, ISBN-10: 1-901992-93-4, Price: £27/ \$56.00 (hardcover). Online booksellers advertise this volume in a price range from \$45.20 to \$84.99. Some standard acronyms used in the monograph and in this review: MOL = Museum of London (known as MoL before 2009), MOLA – Museum of London Archaeology (formerly termed MoLAS), DUA = Department of Urban Archaeology, MPRG = Medieval Pottery Research Group, BIAB = British and Irish Archaeological Bibliography, and LAARC = London Archaeological Archive and Research Centre. Fabric codes include: SSW= shelly-sandy ware, SHER = south Hertfordshire-type greyware, and LIMP = Limpsfield-type ware. Lyn Blackmore and Jacqueline Pearce and the

principal authors, but petrological analyses were undertaken by the late Alan Vince and chemical analyses by Michael J. Hughes and Alan Vince. The volume is dedicated to Vince who passed away on 2009 (Obituary: Alan G. Vince, *SAS [Society for Archaeological Sciences] Bulletin* 32(2):24-25, 2009.) In addition, there is a tribute to Penny MacConnoran, finds manager of DUA and MOLA. Blackmore has written previously about shelly-sandy wares (SSW) while Pearce has written extensively about south Hertfordshire greyware (SHER) and Limpsfield-type ware (LIMP) and they do so again in the current volume; other chapters are joint-authored.

Let me state from the outset that *A Dated Type Series of London Medieval Pottery: Part 5* is probably the most detailed and well-documented ceramic study on a small number of related wares, contextual information, distribution, and chronology that I have read in some years. There is an almost overwhelming amount of descriptive information and technical data on ceramic fabrics and forms and an incredible number of high quality monochrome line drawings and color images (sometimes I wished for metric scales to determine vessel sizes, but narrative descriptions often sufficed). Readers have to examine the tightly-woven narrative closely in order to glean the maximum information from the text. One has to closely read the authors' arguments as to why a radiocarbon date is considered unreliable and relative dating preferred for some contexts or understand the reasoning for redating a site, context, or provenance.

The four other parts in this series were not published by Museum of London Archaeology but by the London and Middlesex Archaeological Society (LAMAS) in their annual *Transactions or Special Papers* series: Pearce, J. E., Vince, A. G., and White, R. (1982) "A dated type-series of London medieval pottery, Part 1: Mill Green ware." *Transactions of the London and Middlesex Archaeological Society* 33: 266-298, Pearce, J. E., Vince, A. G., and Jenner, M. A. (1985) "A dated type-series of London medieval pottery Part 2: London-type ware." *The London and Middlesex Archaeological Society Special Paper* 6. Jenner, A. and Vince, A. G. (1983) "A dated type-series of London medieval pottery, Part 3: A late medieval Hertfordshire glazed ware." *Transactions of the London and Middlesex Archaeological Society* 34:151-170. Pearce, J. E. and Vince, A. G. (1988) "A dated type-series of London medieval pottery, Part 4: Surrey whitewares." *The London and Middlesex Archaeological Society Special Paper* 10.

The current volume is another in this series on the local and regional pottery use in medieval London. The series evolved from the concept of employing large ceramic assemblage from the Thames waterfront, dated by dendrochronology, numismatics (coins and tokens), and other chronologically dated materials, to complement the undated and frequently unprovenanced complete vessels in the Museum of London's archaeological collections. As the authors note, "the complete pots give form and detail to the sherds and the sherds give date and context to the whole pots, allowing far more information to be derived from each source that would otherwise be possible" (p. xvi). For archaeologists and historians interested in London

and the surrounding area, this monograph is an indispensable current assessment providing a compelling, highly-detailed assessment of the status of the studies of two ceramic traditions: shelly-sandy wares of ca. 1140–1220 CE (in the main, city-based but also reaching Scotland and across the North Sea to Scandinavia), and greywares (south Hertfordshire greyware and Limpsfield-type ware) of ca. 1170–1350 CE (used widely in The City [London] but more so in its hinterlands). About 1050 CE, a critical change began to take place on pottery making in southeast England – the development and spread of the potter's wheel so that the production of handmade vessels began to be supplanted gradually by wheel-made products but these production methods co-existed for a lengthy period. Both traditions and the three wares have been reported before in the literature, but those studies focused on sites and contexts within the City of London, while the present more comprehensive and detailed analysis expands the geographic region to Greater London and southeast England. The volume includes fabric analyses, form typologies, a gazetteer of find spots and scientific data, a summary of greyware production centers, and considers function, use, marketing of medieval pottery and the chronology of selected consumer sites in London and its region. In addition, this study takes into account the wider context of contemporary London and its surrounding region with thematic chapters, gazetteers of find spots, and scientific data (notably thin-section petrography and ICP-AES [Inductively Coupled Plasma-Atomic Absorption Spectroscopy]), help to document traditional archaeological approaches to ceramic studies, the chronology of production and consumer sites, vessel forms and functions, and the distributions of these two rather plain, domestic ceramic wares.

This hardback publication is well-made with good boards, a glossy color cover, and sewn text, and following the introductory material, 12 chapters, one of which includes four appendices (ceramic typologies, petrology, and ICP-AES studies) while the other appendix has 86 site summaries within seven groupings. The monograph begins with a "List of Figures" (n = 86 in black-and-white and 68 in color, pp. xi-xiv), "List of Tables" (n = 31, p. xv), a "Summary" (p. xvi), and "Acknowledgments" (pp. xvii). The monograph ends with a "Bibliography" (pp. 318-330) with 518 entries of printed and secondary works and one manuscript source. Most of the reference citations are in English and include works by Dean Arnold (1985) and Prudence Rice (1987) and a few entries in French and German. The abbreviated entries include the authors' last names, initials, date of publication, short title, and journal name, volume and page numbers (or place of publication for books but not the publisher). Blackmore has 39 of her publications listed, while Pearce has 18, and Vince (as senior author) 25; Clive Orton and John Schofield are also well represented (13 each). Late colleagues, Geoff Egan and John Hurst, have two and four entries, respectively. There is four-column four-page "Index" (pp. 331-334) of proper noun names and topics that also includes pagination to the citations in the narrative as well as the illustrations. "German and French Summaries" are also provided (pp. 316-317).

Chapter 1: "Introduction" (pp. 1-6, 2 figures). The authors provide a background to the project, discuss the aims of the study, detail the selection of MOL assemblages, document quantification (following Orton, Tyers, and Vince 1993:171-173), review fabric and forms, as well as dating. "For the most part, only sites that were adequately phased and dated were considered for the archaeological survey. The detailed typological chronology was largely based on the three waterfront sites that had formed the core of the analysis for London-type wares and Surry whitewares... supplemented by assemblages from both within and outside the City of London (Tables 29-31) ... selection of material from the Museum of London sites was based on personal knowledge and the availability of suitable contemporaneous assemblages that have been sufficiently researched to allow identification" (p. 2). The authors follow the guidelines of the MPG 1998 and BIAB. Three chronological periods are reviewed: Early Medieval period, 410-1066 CE; Medieval, 1066-1547; and Post-Medieval, 1547-present. The authors also discuss the structure of the volume and textual and graphic conventions. Site designations, pottery codes, illustrations and units of measurement are also stated. Chapter 2: "The Historical Archaeological and Ceramic Background" (pp. 7-21, 9 figures [2 in color], 3 tables). The chapter focuses historically on "Kings and commerce," The City (London) and waterfront sequence, Southwark, the production sites, and market towns and ports. London was in a strategic location and had significant economic and demographic growth during the period of this study (ca. 1150-1350 CE). The ceramic sequence to ca. 1400 CE is reviewed and the authors point out that London-type ware and north French- and Rouen-style jugs are important as dating tools. Chapter 3: "Shelly-sandy ware in Its Regional Context" (pp. 22-35, 3 figures, 1 table). There is a discussion of Saxo-Norman and "Early Medieval" shell-tempered wares used in London and a discussion of the comparative survey of SSW in southeast England. Thirty-six sites in eight regions were selected and wares, date ranges, descriptions, and references provided for each site. The regions were: Oxfordshire, Berkshire, Bedfordshire and Buckinghamshire, Hertfordshire, Middlesex, South Essex, North and West Kent, and Surrey.

Chapter 4: "Description and Type Series of Shelly-sandy Ware" (pp. 36-67, 31 figures [12 in color], 5 tables). Blackmore details the analyses, including discussions of fabrics and firing, petrography, and ICP-AES. Vince with Blackmore (pp. 37-39) found organics, shell, algal limestone, quartz, Muscovite, fine and, flint and chert, iron grains, and glauconite as characteristic of the fabric. Firing temperatures were 700-800° C and a few specimens with spots of clear glaze (SSW is unglazed). The ceramic was both handmade and in a transition, also wheelmade. Sixteen rim and five neck forms were defined for jars and storage jars, decorated with rilling, thumbled and dimpled rims, and incision; pipkins are a rare form (only a few rims have been recovered) but tripod pipkins, cauldrons, and possible cauldrons were more common; four forms of bowls and dishes had incised, impressed, or applied decoration. Lighting and heating vessels included lamps and curfews (large handled lids to enclose embers in a pot. The assemblage also included jugs, spouted pitchers, and a possible chimney base.

The leaching of shell during post use deposition is also noted. Chapter 5: "Distribution, Dating, and Discussion of Shelly-sandy Ware (pp. 68-82, 2 figures, 2 tables). Pre-1140 CE SSW is discussed but the development and peak of manufacture was 1140-1200 with the end of the tradition in the early 13th century. The main affinities are The City of London, northwest Kent, south Essex, and Surry, as well as Scotland and Scandinavia (Bergen Trondheim, and Oslo). Chronology, decoration, trade and distribution are also detailed.

Chapter 6: "The Greyware Industries" (pp. 83-134, 18 figures [5 in color], 6 tables). Greywares are unglazed, wheel-thrown and deliberately fired in a reduced atmosphere, and date from the late 12th to late 14th centuries in Hertfordshire and north and west Middlesex. Eight production sites with kilns have been excavated (up to 2003) out of 45 identified loci based on wasters, kiln furniture and other debris. South Hertfordshire-type greyware (SHER) is documented as to chronologies, descriptions, comments and references for 13 sites (Table 10) as is Limpsfield-type ware (Table 11) reported from 17 sites. There is a detailed discussion of the production sites accompanied by salient illustrations; 13 SHER and 9 LIMP. Figure 48 is a color geological map of the region with finds and production loci plotted; figure 49 illustrates in color eight fresh sherd breaks from thin-sectioned specimens. Coarse silt/find sand composes the matrix and fabrication analysis by petrography and ICP-AES is detailed in Appendices 11.3 and 11.4 (discussed subsequently in this review). Vessels were formed by hand or on the wheel and unglazed but some sherds were decorated by combing; rims, bases, handles, and handle attachment methods are detailed. Pearce also reports on 12 kiln sites, kiln furniture, stacking and firing methods, and firing faults (Table 15). Chapter 7: "Type series of Greywares from London" (pp. 135-200, 69 figures [30 in color], 3 tables). SHER jar shapes and sized are reported, 16 rim types documented, chronological placements reviewed, decorations (rouletting, incised wavy lines, and applique) characterized, and secondary uses and pre-firing modifications noted (p. 150). The ceramics are described in a standard manner: rim forms, bases, handles, body decoration, and surface treatments. Other SHER vessels described include: large storage jars and bunghole jars (n = 19); bows and dishes (six rim forms with incised or appliqued decoration); handled bowls (five types); socketed and spouted bowls/dishes; colanders; dripping dishes (seven types); jugs; 16 variants of bottles; drinking jugs; and lamps and curfews. For LIMP pottery, 39 variants of jars and cooking pots, 14 bowls and dishes, one handled bowl, 18 jugs types, and seven forms of curfews are discussed using the same reporting format as SHER. The 35 decorated types of handles are useful in dating. Chapter 8: "Discussion of Greywares" (pp. 201-225, 2 figures, 2 tables). Dating of early SHER coarseware (ca. 1133-1440), SHER (1040-1400), and Limpsfield-type ware (ca. 1203-1440) are based on "updated" Thames waterfront sequences (pp. 7-17, 298-309). The growth, peak, and decline of these ceramics are reviewed and eight phases documented for SHER and eight for LIMP; each ceramic group has slightly different phase dates. The focus of SHER production was in Hertfordshire and Middlesex which over a 150-year period had a strong hold on supplying pottery to London (p. 215). LIMP was part of a wider coarseware

tradition in Surry and the production sites are more scattered. The devastating effects of the Black Death correlate with the replacement of LIMP ceramics ca. 1350 ff. by glazed Surry whitewares.

Chapter 9: "Shelly-sandy Ware and Greyware Industries: Form and Function" (pp. 226-233). The review of forms and functions indicates that SSW jars were used for storage as well as heating food, small pipkins were used for controlled cooking, and cauldrons for slow cooking (such as stewing). Bowls, dishes, dripping dishes, lids, spouted pitchers and jugs, bottles and drinking jugs, and curfews and lamps, are reviewed. Notably, secondary uses are rare and there is no evidence of vessel repair for continued use. Chapter 10: "General Discussion and Conclusions" (pp. 234-248, 4 figure). In London, handmade ceramics made from 1050-1150 showed regional variation and local and regional marketing and distribution. Figures 137 and 138 illustrate the distribution of SHER and LIMP in the City of London, while Figure 139 shows the Greater London distributions of SSW and SHER and LIMP, and Figure 140 illustrates distribution of these ceramics in southeast England. By 1350 Surry glazed whitewares replaced LIMP. This study demonstrates that technology, functional, and stylistic innovation in the production of medieval coarseware potteries that supplied London was a result of highly complex exchange systems, notably client-based relationships and markets. The chronology and development of SSW are signal results of this study, while the greyware sequence has been refined. The potter's wheel spread north and west from London to peripheral areas and the ceramic vessels became more standardized. Some attempts are made to add sociocultural contents to the ceramic supply and demand, but the assembled data does not yet permit calculations of the scale of production. The chapter concludes with a list of 15 projects for future research.

Chapter 11: "Appendices" (pp. 249-277, 7 figures, 7 tables). The MOLA fabric codes and MPRG form types are included in appendices and there are five summaries: 1, 2, and 3) rim typologies in SHER, LIPM, and SSW (Type F); 4) jug handle treatments; and 5) decorative codes. "Petrological and Chemical Analyses of London SSW and comparanda" was prepared by Alan Vince (pp. 255-261) resulting in seven fabric descriptions detailed through thin-section petrography (there are 14 color thin-section photomicrographs); 18 sherds underwent SEM analysis at the University of Birmingham and 24 were analyzed by ICP-AES at Royal Holloway College, London. In general, London specimens could not be differentiated from Essex materials but some Kent specimens are distinguishable. Vince also prepared "Petrological and Chemical Analyses of greywares from various sites in the counties adjacent to London" (pp. 261-271) based on the analysis 104 thin-sections (46 color thin-section photomicrographs). All specimens characteristically have quartzose sand, chert, limestone, flint, opaque grains, glauconite, and clay pellets; variants are also discussed. The clay sources were river valley or terrace gravels. M. J. Hughes contributed "ICP-AES analysis of south Hertfordshire greywares" (pp. 273-277) on 104 specimens analyzed at Royal Holloway College, London. The results of the plots are

discussed and he notes that the chemistries differ between the known production sites but that other manufacturing loci are not yet discerned. Lastly, Chapter 12: "Site Summaries" (pp. 278-315, 4 tables), includes ceramic concordances for The City (Table 28, pp. 278-289; 48 sites); Greater London (Table 29, pp. 289-295; 15 sites); and Outside of the Greater London area: Bedfordshire (one site), Essex (eight sites), Kent (six sites), Middlesex (two sites), and Surrey (two sites).

This splendid up-to-date assessment provides a model that other scholars of ceramics should emulate and also documents the need for investigators to undertake future research projects based on the results documented in this monograph.

Analysing Pottery: Processing - Classification - Publication, Barbara Horejs, Reinhard Jung, and Peter Pavúk (eds.), *Studia Archaeologica et Mediaevalia Tomus X*, Bratislava, Slovakia: Comenius University in Bratislava, 2010. (Distributed by VML Verlag Marie Leidorf GmbH, Rahden/Westf.) DinA4 size, 324 pp., 127 illustrations, 18 tables, ISBN-13: 978-80-223-2748-0, ISBN-10: 80-223-2748-0. €45, 00 (paperback). This is not an easy volume to acquire in North America due primarily to shipping costs that may exceed the price of the volume. I thank Peter Pavúk (Department of Archaeology, Program in Classical Archaeology, Comenius University, Gondova 2, SK-81499 Bratislava, Slovakia) for attempting (unsuccessfully) to provide a copy for review last fall (I would pay for it). The distributor (Verlag Marie Leidorf) indicated that "Since this subject was bit too narrow for our publishing house, the volume will be made available by alternate means, either via book exchange (contact Dr. Peter Pavuk, pavuk@fphil.uniba.sk or online [through the distributor] at <http://www.vml-verlag.de/e/detail.php?ISBN=978-80-223-2748-0>." Unfortunately, the distributor's URL also now indicates (July 2011) that the volume has been "out of print" since May 2011. However, your reviewer was fortunate to acquire a copy through Oxbow Books, Ltd., the UK office of the David Brown Book Company.

This monograph focuses on the issue of "ceramic survival" and large quantities of pottery from hundreds of contexts (often in secondary or tertiary depositions), pottery from short-lived settlements or multicomponent settlements inhabited for millennia, including plain and decorated pottery, handmade pottery and wheel-thrown mass-produced wares. The papers often provide ceramic ware definitions, employ multivariate analyses or other statistics, and sometimes database systems. All of the 16 contributions by 20 authors focus on materials from Eastern and Southeastern Europe and immediate Mediterranean littoral and Southwest Asia: ceramics from Troy, Turkey; pottery of the Moravian Bronze Age and of the Polish Bronze Age; Aegean pottery in the Mediterranean; ceramics from Phaistos and Aya Triada of Middle Minoan III period; Hittite contexts from Kuşaklı and Boğazköy, Turkey; pottery from the Egyptian site of Tell el-Dabca/Avaris: cooking wares from the Late Bronze Age Aegean; a Late Bronze Age burnt layer of the Apennine fortification walls at Roca, Italy; Latène pottery at Straubing-Bajuwarenstraße, Germany; Roman and Early Byzantine amphorae from Sagalassos, Turkey, and Bronze Age pottery from Aegina Kolonna. The contributors to

this volume either presented papers at one of two scientific meetings Bratislava (November 2003) or Cracow (September 2006) or were invited by the editors to prepare essays for this monograph. In the main, the papers concern the basic question of how to deal with “large amounts of pottery from long-term excavations,” and the editors focused on the periods from the Bronze Age to the Early Middle Ages. They state that because of the ‘important role of methodology, we have actively sought out contributions from a wider range of geographic regions and chronological periods’ (p. 7). The goal of this publication is to provide fresh insights into “modern approaches” in processing large ceramic collections. Each of the 16 essays has its own set of footnotes and references. Ten contributions are in English and six are in German. There is no overall list of illustrations or index but there is a “List of Contributors” which includes postal and email addresses (pp. 323-324).

Barbara Horejs, Reinhard Jung, and Peter Pavúk’s “Introductory Remarks, or What Should Be Done with a Pile of Sherds” (pp. 9-14, no illustrations or references). The chapter provides contextual materials on the classification, documentation, analysis, and publication of ceramic studies. Barbara Horejs’s “Possibilities and Limitations in Analysing Ceramic Wares” (pp. 15-27, 4 figures, 48 references, 55 footnotes) essay focuses on artifacts from Late Bronze Age Olynthus and Troy and Mynyan Ware in a discussion of wares, production origins, data dissemination, and analytical methodologies. She discusses hardness, porosity, break (sic.), colour, temper, and surface treatments. Other topics include a correlation of German, Greek, Turkish, and English-language terminologies. She refers to major works such as Orton, Tyers and Vince (1993), Rice (1987), and Shepard (1980). “Owen (1991)” is cited in the narrative but does not appear in the references but might be Owen Rye’s (1991) *Pottery Technology: Principles and Reconstruction*, Washington, DC: Taraxacum; the Anna Shepard (1980) reference is to *Ceramics for the Archaeologist*, Washington DC: Carnegie Institution of Washington (the publication date for the revised edition is 1976 and the city is Washington, not Ann Arbor, MI). Lydia Berger contributed “Zur Terminologie und Definition der Oberflächenbehandlung anhand gebrannter Gefäße in der prähistorischen Keramikforschung” (pp. 29-37, 2 figures, 31 references, 44 footnotes). The author discusses issues of pottery processing, emphasizing fabrics and surface treatments (finishing, slipping, glazing, painting, and burnishing), and provides German-language terminological definitions. Jirí Machacek wrote “Zur Methode der Bearbeitung der (frühmittelalterlichen) Keramik aus Siedlungsarealen” (pp. 41-71, 16 diagrams, 4 table, 57 references, 97 footnotes). Machacek discusses the methods for processing the Early Medieval pottery from settlement areas. Five major topics are treated in the narrative: pottery taphonomy, analysis of the ceramic, description, statistical analysis and interpretation. There are also important discussions on the use of cluster analysis, ceramic types, dating, and artifact authentication.

Peter Pavúk authored very significant paper, “Pottery Processing at Troy: Typology, Stratigraphy and Correspondence Analysis: How Do They Work Together?” (pp. 73-98, 13 figures, 35 references, 62 footnotes). Troy is, of

course, a multiphase and multicomponent site dating 3000 BCE to the 13th century BCE and “fits” the monograph’s topic with tons of pottery excavated by multiple expeditions from many contexts and disturbed stratigraphies. Pavúk discusses hand- and wheel-made pottery, ceramic recording systems, and the identification of wares, but focuses on Troy VI pottery excavated since 1993 from 291 excavation units. In his essay he considers correspondence analysis undertaken by Weniger in 1993 and 2002 (139 vessel shapes and 27n settlement phases), and the EBA stratigraphy and dating of ditch fill (373 units); Pavúk’s own analysis of Troy VI pottery dates 2000-2002. To date there have been ten contributions on seriation/correspondence analysis undertaken to understand Trojan ceramics. He writes: “interesting data can be obtained, one just has to look for them” (p. 94). Klára Sabatová, “Möglichkeiten der statistischen Methoden bei der Auswertung eines bronzezeitlichen Fundorts (Práslavice, Mähren, Tschechische Republik)” (pp. 99-120, 15 figures, 14 references, 31 footnotes), reviews the potential uses of statistical methods in the evaluation of ceramic assemblages from the settlement and cemetery at the Bronze Age locality of Práslavice. She employs petrographic analyses along with statistical studies (cluster, factor, and correspondence analyses) in this assessment. Julia Kneisel, Hauke Dibbern, and Sarah Diers were the coauthors of “Ein Aufnahmesystem für bronzezeitliche Keramik” (pp. 121-142, 17 figures, 22 references, 29 footnotes) which focuses on the site of Bruszczewo. The authors provide historical background, define ceramic technological parameters including forms, types, and stratigraphies. Fabric descriptions and data from technological and statistical assessments (seriation, correspondence analysis, and cluster analysis) are assembled in a database.

Reinhard Jung’s “Classification, Counting and Publication of Aegean-Type Pottery around the Mediterranean” (pp. 145-162, 3 figures, 94 references, 63 footnotes) begins with a history of research on Mycenaean pottery (following mostly Furumark and Mountjoy’s published works), and there is a statistical analysis of painted sherds. He discusses the problem of counting minimum numbers of Mycenaean vessels and provides an elaborate discussion of wares and fabrics that includes Mycenae and locations outside of the center of Mycenaean civilization, notably Cyprus, the Levant, and Palestine. Luca Girella authored “The Gold of Rhadamanthus: Ceramic Deposits and Wares Distribution at Phaistos and Ayia Triada during Middle Minoan III period” (pp. 163-186, 8 figures, 78 references, 74 footnotes). There is a useful discussion of Kamares ware and its continuity into Middle Minoan III at the Phaistos palace and considerations of methodological issues, diachronic differences in excavation strategies and procedures in recording pottery. Girella provides an analysis of ceramic fabrics, surface treatments, construction methods, and morphological details prior to a focus on 32 MM III ceramic deposits containing plain, monochrome, light-on-dark ware, and polychrome ceramics. Fifteen MM III deposits at Ayia Triada have the same set of ceramics plus pithos ware which was present but not well represented. It is important to differentiate MM IIIA and MM IIIB and the author concludes by examining several models of non-centralized ceramic production. Dirk Paul Mielke in “Kusakli und Bogazköy

(Türkei) -- Zwei Ansätze zur Bearbeitung großer Keramikmengen aus hethitischen Kontexten” (pp. 187-207, 8 figures, 32 references, 80 footnotes) provides context and background to the sites and methodologies for naming and documenting ceramics. He provides a current chronological evaluation of vessel forms and typological and technical analyses, but suggests a reassessment of vessel forms and chronologies.

Author Bettina Bader’s contribution, “Processing and Analysis of Ceramic Finds at the Egyptian Site of Tell el-Daba/Avaris (“Eves” and Other Strange Animals)” (pp. 209-233, 13 figures, 3 tables, 2 graphs, 57 references, 39 footnotes), concerns a site in the northeastern Nile Delta. She discusses prior excavations and pottery processing, discusses problems of assigning sherds to types, and details the ceramics in Offering Pit 6382 (cups, beakers, and cooking pots) and suggests “estimated vessel equivalents” with a comparative quantification involving 15 vessel types. Bartłomiej Lis wrote “Cooking Pottery in the Late Bronze Age Aegean -- an Attempt at a Methodological Approach” (pp. 235-244, 3 figures, 18 references, 20 footnotes) concerning the site of Mitrou located in east-central Greece. The nature of the site, ceramic classification system, technological and morphological classifications, proceedings for recording fabric colours and dimensions are reviewed. Teodoro Scarano’s essay, “The Burnt Layer of the Apennine Fortification Walls of Roca (Lecce, Italy): the Typological Classification of Pottery Assemblages as an Instrument for Functional Characterisation of Archaeological Contexts” (pp. 245-262, 5 figures, 40 references, 44 footnotes), concerns the Middle Bronze Age excavations at Roca where four postern gates and a monumental gate were uncovered, revealing associated ceramic assemblages. The ceramics are described along with the study methods and goals (ca. 200 hand-made vessels were classified into 15 types).. Problems in differentiating cups, bowls, and dippers are reviewed and a radiocarbon date of 1448-1379 cal BCE reported.

Claudia Tappert’s illuminating chapter, Statistical Analysis and Historical Interpretation -- La Tène Pottery from Straubing-Bajuwarenstraße, Lower Bavaria” (pp. 263-284, 11 figures, 31 references, 71 footnotes), returns to the monograph’s précis: “Dealing with thousands of highly fragmented potsherds from settlement contexts may be the one of the biggest challenges an archaeologist can face, especially if funding for technical support and for natural scientific analysis is lacking” (p. 263). She characterizes the site of Straubing-Bajuwarenstraße located on the Danube plain in Lower Bavaria and dating to the 5th-1st century BCE but with Neolithic, Early Bronze Age, Late Bronze Age, and Medieval materials were included in 70 “big boxes” of artifacts, mostly pottery, that she studied. There is a description of the analytical techniques employed and a calculation of minimum vessel numbers (9,607 including 2,567 rims). Three ceramic groups were identified based on temper analysis; forms and decorations (applique and painting) are also reported. Her statistical analysis demonstrates that there was a diachronic shift from complex to simple ceramic forms. Three settlement phases and their sociocultural interpretations are documented. Markku Corremans, Jeroen Poblome, Philip Bes, and Maic Waelkens collaborated in preparing “The

Quantification of Amphorae from Roman Sagalassos, Southwest Turkey’ (pp. 285-303, 16 figures, 53 references, 75 footnotes). The authors explain their quantification methods and discuss theoretical and practical issues encountered during the processing of the ceramic collection. The regional nature of Sagalassos red slip ceramics and Roman era pottery production and imports are reviewed. Four amphora fabrics are discerned and they determine a minimum number of vessels and estimated vessel equivalents, and state their preliminary results of fabric analysis, absolute and relative counts, and imports. The final contribution by Walter Gaus, “Ägina Kolonna: Materialaufnahme, Dokumentation und Datenverwaltung” (pp. 307-321, 9 figures, 18 references, 26 footnotes), focuses on the SCIEM 2000 Project database and reports ceramic groupings and classifications in relation to site stratigraphy and chronology. Four issues related to the analysis are reviewed and there are sample catalog records and photographs.

Collectively, the essays focus on “pottery survival” and sites with large quantities of sherd material that need analysis and characterization studies. A number of problems and issues in dealing with large collections are discerned but the methods of analysis and data presentations are quite varied. It is a credit to the editors that they have assembled this benchmark monograph which is useful to other researchers working with large pottery collections. I found the essays by Pavúk and Tappert especially good reading. Sadly, the volume suffers from the lack of an overall, incisive summation of the 16 contributions by 20 authors. There are a few errors in the references and they lack the names of publishers and sometimes article pagination. It is lamentable that the volume was difficult to obtain and is now out-of-print.

Chinese Ceramics: From the Paleolithic Period through the Qing Dynasty, Li Zhiyan, Virginia L. Bower, and He Li (eds.), New Haven: Yale University and Foreign Languages Press, 2010. xv + 687 pp., ca. 75 black-and-white and 700 color illustrations, ISBN: 9780300112788, \$85.00 (cloth). This new compendium on Chinese ceramics is jointly produced by Foreign Language Press in China and Yale University Press in the United States. The three editors are distinguished scholars: Li Zhiyan is senior research fellow at the National Museum of China and former vice president of the Association of Chinese Ancient Ceramics; Virginia L. Bower is an adjunct associate professor at the University of the Arts, Philadelphia; and He Li is associate curator of Chinese art, Asian Art Museum of San Francisco. In addition to the essays provided by the editors, there are seven other contributors: David Ake Sensabaugh is the Ruth and Bruce Dayton Curator of Asian Art at the Yale University Art Gallery; Ding Pengbo is research fellow at the National Museum of China; Li Jixian is research fellow at the Chinese Institute of Art and a member of the Chinese Society of Archaeology; Quan Kuishan is professor at the School of Archaeology and Museology, Peking University; Laurie E. Barnes is Elizabeth B. McGraw Curator of Chinese Art at the Norton Museum of Art; Kanazawa Yoh is a curator at the Idemitsu Museum of Arts, Tokyo; and William R. Sargent is an independent scholar and curator, and the former curator of Asian export art at the Peabody Essex Museum. This massive, comprehensive volume is the result of ten-year collaboration

among eminent American, Chinese, and Japanese scholars, and provides a new perspective in interpreting the oldest Chinese art forms, from its technological aspects to its aesthetic value. Its publication was made possible through the financial support of The William and Flora Hewlett Foundation, The Henry Luce Foundation, Inc., The National Endowment for the Humanities, The Rosenkranz Foundation and the Starr Foundation, as well as Ruth and Bruce Dayton, Robert Hatfield Ellsworth, J. S. Lee, Patricia Mellon, and John and Cynthia Reed. This superbly illustrated treatise and the detailed essays provide a comprehensive historical review of Chinese ceramics covering newly excavated discoveries from the Paleolithic era to the end of the Qing dynasty in 1911. One of the authors, He Li, writes, "Despite the rich variety of Chinese ceramics around the world, no fully illustrated, photographed survey of a complete history has been attempted in English. [This volume] will convey the excitement of encountering these specially chosen examples for the first time." The contributors, all recognized experts on their subjects, are from China, Japan, Korea, India, Turkey, France, the UK, and North America.

Structurally, this weighty tome is well-bound and begins with basic introductory materials that provide important context: A "Chronology" (p. x) has an appended statement that "Exact dates may vary depending on scholars' interpretations"; a tabulation of "Emperors of the Song, Yuan, Ming, and Qing Dynasties" (p. xi); a general color "Map of China" extending from eastern Afghanistan through the Korean Peninsula (pp. xii-xiii); and a "Foreword" by David Ake Sensabaugh (pp. xiv-xv). He reviews perspectives on Chinese archaeology and the history of ceramics as well as the geology of China which had a decisive role in shaping the history of ceramics in China. Your reviewer notes that Chinese sociopolitical history is complex and that some chronologies are uncertain. An up-to-date source is *The Berkshire Encyclopedia of China*; see, for example, Charles C. Kolb: "Xia Dynasty (21st to 16th century BCE)" (pp. 2493-2495); "Han Dynasty (202 BCE-220 CE)" (pp. 985-990); "Southern and Northern Dynasties" (420-589 CE) (pp. 2060-2062); and "Five Dynasties and Ten Kingdoms (907-960 CE)" (pp. 827-830) in *The Berkshire Encyclopedia of China*, Linsun Cheng (ed.), Great Barrington, MA: Berkshire Reference Works [electronic version] and New York: Charles Scribner's Sons/Thomson Gale [print version], 2009.

Separate "Introductions" by Li Zhiyan and Virginia L. Bower precede nine chapters in chronological sequence, followed by chapter on Chinese export ceramics, divided into three parts each with its own author (Kanazawa Yoh, He Li, and William R. Sargent) that delves into Chinese trade activities and ceramic wares made for export; and lastly, a chapter by Li Zhiyan about the authenticity of Chinese ceramics, in which he discusses issues related to connoisseurship of Chinese art. This scholarly work has "Notes" (a total of 860, pp. 617-646); an Appendix with four maps (pp. 647-650, "Neolithic," "Tang Dynasty," "Song, Liao, Jin Dynasties," and "Chinese Trade Routes") and "Further Readings" (pp. 651-653) with 120 references and 15 periodicals listed. A "List of Contributors" (pp. 655-656), "Acknowledgments" (pp. 657-658), "Illustration Credits" (pp. 659-661), and "Index" (three-column conflating proper nouns and topics, pp. 663-687) complete the volume. There are 652

numbered figures (597 color and 55 black-and-white); the color illustrations frequently have multiple images in a single figure, while the monochromes are drawings (mostly from Chinese publications such as Wenwu Press), that lack metric scales or data on vessel sizes.

The "Introduction" (pp. 1-29, 22 figures [20 in color], 21 endnotes) is in two parts: "Introduction, Part I" by Li Zhiyan (pp. 1-16) and "Introduction, Part II" by Virginia L. Bower (pp. 17-29). Li Zhiyan provides an overview of Chinese ceramic history from 14,000 BP to 1911 CE, in which he discusses earthenware, celadon, stoneware, the cultures of the Yellow River valley (6006 BCE and since), and expansion into other provinces since 3800 BCE. The overview encompasses Xia, Shang, Zhou, Qin, Han, Song, Liao, Western Xia, Jin, Yuan, Ming, and Qing dynasties and notes the importance of Jingdezhen porcelains. There are three themes in Chinese ceramics: continuity, national or ethnic character, geography and periodization, foreign influences, and the spread of Chinese ceramics. Bower points out that the contributions to this volume present a "diversity of voices" on chronologies and scholarly debates, and that each chapter is independently readable and cross-referenced to the others. She also discusses significant historical documents (*Standard Histories*, *Veritable Records*, and *Tao ji [Ceramic Memoir]*), European works (French Jesuits in particular), and research by American scholars. Joseph Needham's work on Chinese technologies is also noted: *Science and Civilisation in China: Volume 5, Chemistry and Chemical Technology, Part 12, Ceramic Technology* (Rose Kerr, ed., written by Rose Kerr and Nigel Wood, with additional contributions by Ts'ai Mei-fen and Zhang Fukang; Cambridge and New York: Cambridge University Press, 2004). The volume was reviewed previously in *SAS Bulletin* 28(1-2):24-27 (2005). Bower also reviews problems of nomenclature, maritime explorations, and new excavations at Jingdezhen.

Chapter 1 "Prehistoric Earthenware" by Li Zhiyan (pp. 31-89, 59 figures [44 in color], 44 endnotes). The relationship of agriculture to the evolution of earthenware is reviewed and earliest ceramics (8000-6000 BCE) discussed, including manufacture, forms and functions, and C14 dates (both Carbon-14 and Hydrocarbon-14 dating are mentioned, pp. 38-39). Ten major regional ceramic variants are noted and the author delineates the ceramics of the Yellow River valley (5000-2000 BCE) with five periods and 16 regional variants prior to the beginning of Longshan culture (pp. 72-77). Neolithic ceramics of the Yangtze River valley and southern China (5000-5000 BCE), with eight regional variants, are also reviewed. Anne P. Underhill's *Craft Production and Social Change in Northern China* (New York: Kluwer Academic/Plenum Publishers, 2002) provides a fuller review of the period. Chapter 2 "Ceramics of the Xia, Shang, and Western Zhou Dynasties and the Spring and Autumn Period" by Quan Kuishan, Ding Pengbo, and Li Zhiyan (pp. 91-115, 16 figures [23 in color], 14 endnotes). Xia culture (2070-1600 BCE) is represented by ancient texts and the archaeological record; earthenware forms and functions, decorations, and kilns are documented. Shang (1600-1046) earthenware forms and functions and decorations are reviewed before a discussion of Western Zhou (1046-771 BCE) and

Eastern Zhou (770-256 BCE) pottery characterized by the introduction of iron tools, ox plowing, and the development of stoneware or “Proto-Porcelain.”

Chapter 3 “Ceramics of the Warring States Period and the Qin and Han Dynasties” by Li Zhiyan (pp. 117-159, 48 figures [31 in color], 13 endnotes). The Qin (221-206 BCE) and Han (206 BCE-CE 220) dynasties are next reviewed; hard earthenware with impressed designs, earthenware tomb sculptures (terracotta warriors of the “Army of the First Emperor,” Qin Shihuang), six jar forms, granaries, basins, oil lamps, and ceramic architectural elements (tiles, tile heads, drains, drain pipes, solid and hollow bricks, and brick reliefs) are noted. Han glazed earthenware vessels, early glazed stoneware of the Qin and Han periods, “Proto-Porcelain” or “Proto-Celadon” and mature porcelains are also reviewed. Seven examples of house models (pp. 146-150) are also illustrated; for a full explanation, see *The Mingqi Pottery Buildings of Han Dynasty China 206 BC-AD 220: Architectural Representations and Represented Architecture* by Qinghua Guo (Sussex: Sussex Academic Press, 2010), reviewed in *SAS Bulletin* 33(3):13-15 (2010). The chapter also reviews polychrome decoration on earthenware sculpture, notably the terracotta warriors and cavalry horses of the Army of the First Emperor Qin Shihuang, early glazed stoneware of the Warring States, Qin and Han periods, and Proto-Porcelains (or Proto-Celadons). Chapter 4 “Ceramics of the Period of Division” by Quan Kuishan (pp. 161-195, 57 figures [54 in color], 22 endnotes). This politically complex era is a period of dramatic advances in Chinese ceramic production, notably in celadons. The review covers the Three Kingdoms (ca. 220-265), Western Jin (165-317), Eastern Jin (317-420), and the Northern Dynasties (386-581) and Southern Dynasties (420-589). There is a rather basic discussion of Southern and Northern earthenwares, glazed earthenwares and pilgrim flasks. New technological developments in high-fired ceramics include “mature” porcelains, new kiln types, and black-glazed stonewares. Innovations in firing technologies are also detailed (pp. 193-195).

Chapter 5 “Ceramics of the Sui, Tang, and Five Dynasties” by Li Zhiyan (pp. 197-263, 81 figures [78 in color], 42 endnotes). The Sui (581-618), Song (618-907) and Five Dynasties (907-960) periods are reviewed in terms of social, political, and economic contacts. Types of ceramics increasingly came to be identified by a geographic area “where the most noteworthy or characteristic kiln complex producing that type of ware was located” (p. 198). Expanding markets and transportation networks led to an “unprecedented” increase in trade along the Silk Road. Glazed earthenware production was revitalized and high-fired white celadons are also produced. Fourteen high-fired wares were produced in the south (618-960), among them Yue, Mo se ci (“Secret Color”), Ou, and Wuzhou wares, and the Jingdezhen kiln was possibly active (the usual earliest date is 1004 CE). At the same time, three wares were produced in the north. Innovations included underglaze blue (early Blue and White), Black Variegated, and Three-color (Sancai) ceramics and detailed human and animal sculptures (pp. 246-262). Chapter 6 “Ceramics of the Song, Liao, Western Xia, and Jin Dynasties” by He Li (pp. 265-329, 71 figures [65 in color], 97 endnotes). These four dynasties, Song (960-1279), Liao (the

“Khitans”) (907-1125), Western Xia (1038-1227), and Jin (1115-1234) are next characterized. Notable innovations include Ding wares (mostly white porcelains but some in red or purple), northern celadons (fired with the use of saggars), and Ru, Jun, and Cizhou wares; southern “official” wares, (fired in dragon kilns in southern Song), Bluish-whit porcelains, and dark glazed ceramics. Major kiln site are also discussed.

Chapter 7 “Yuan Dynasty Ceramics” by Laurie E. Barnes (pp. 331-385, 57 figures [55 in color], 259 endnotes). Longquan celadons, Ge ware, Jun ware, architectural elements, a variety of white wares, and Cizhou ceramics are detailed; major new discoveries include kilns and caches of Yuan pottery (pp. 351-362). Barnes also reviews common domestic ceramics; materials recovered from shipwrecks, the Imperial and private kilns, and the ascendancy of the Jingdezhen kiln as well as the organization of production. The evolution of Imperial Blue and White porcelain is detailed as is the transition from the Yuan to Ming Imperial Style. Chapter 8 “Ming Dynasty Ceramics” by Li Zhiyan (pp. 387-457, 63 figures [61 in color], 103 endnotes). Li documents Ming society and advances in ceramic technology, the Ming kilns, Imperial porcelain factories, “Official” porcelains, monochrome red, monochrome black, and underglaze blue ceramics. Yongle and Xuande porcelains are considered as is the ceramic interregnum (1436-1464) when there was a marked change in motifs selected for decorating porcelains. He also discusses cultural policies and early Ming porcelain artistry, technological advanced in mid-Ming porcelain production and Late Ming products. Chapter 9 “Qing Dynasty Ceramics” by Li Jixian (pp. 459-533, 90 figures [all in color], 38 endnotes). The period is characterized by remarkable ceramic diversity and technical excellence. Five porcelains are reported: Shunzhi (1644-1661), Kangxi (1662-1722), Qianlong (1736-1795), Jiaqing-Xuanlong (1796-1911), and Hongxian porcelains. Eight local kilns are documented for this era.

Chapter 10 “The Export and Trade of Chinese Ceramics” (pp. 235-601, 77 figures [75 in color], 203 endnotes) has three parts with separate authors. These are “An Overview of the History and Scholarship to Date” by Kanazawa Yoh (pp. 535-563), “Historical Aspects of Later Chinese Export and Trade Ceramics” by He Li (pp. 563-569), and “During the Later Dynasties” by William R. Sargent (pp. 569-601). These authors document the historical background to the export trade, land and maritime trade routes, the evidence from shipwrecks, the periods of active exportation: 750-950 CE, 1050-12th century, 13th-14th centuries, 16th-17th centuries, and 17th-18th centuries. Maritime exports to Europe and the Americas are reviewed and he discusses the use of metal mounts and other embellishments to Chinese ceramic in 17th-18th-century France. Chapter 11 “Ten Lectures on the Authentication of Chinese Ceramics” by Li Zhiyan (pp. 603-615, 11 figures [all in color], 4 endnotes). The ten are: the importance of exposing forgeries, using archaeology for accurate dating, employing typology to ascertain patterns, understanding ceramic forms, indemnifying idiosyncrasies in ceramic manufacture, determining authenticity from clay composition, using decorative motifs and styles, examining traces of hand labor to understand how wares were made, adapting to new types of forgeries, and using scientific tests. No details are provided on the latter.

This important comprehensive volume, predominantly art historical and historical, is a significant contribution to Chinese and global ceramics. The coverage from the earliest prehistoric ceramics to 1911 CE is unique and the essays are up-to-date, well-documented by their world-class scholar-authors', and the illustrations are excellent. It would be a valuable addition to college, university, and public libraries, and scholars' personal collections.

Previous Meeting

Eastfield Village Workshop 2011 "Redware in America 1650-1850" was held 24-26 June 2011 at Eastfield Village, East Nassau, New York. Redware in a variety of forms has been in use in America since early colonization. British and domestically-produced wares were the focus of this year's program. While some Chinese wares were imported directly to this country, the British produced and exported a variety of red bodied wares based on Chinese models. In addition, a large number of local potteries in the United States were making an array of inexpensive domestic redware for use in taverns, farm houses, kitchens and pantries. In the early 19th century cities such as Philadelphia boasted potteries making nicely fired red bodied pots in competition with English imports. Workshop participants were encouraged to bring examples of pots and shards for discussion. The lectures included: "An Overview of Redware in America" by J. Garrison Stradling and his wife Diana (he is a New York City scholar dealer specializing in rare and important American artifacts, with a concentration on ceramics and glass). "To Put You in Mind of a Red Pot Teapot" by David Barker is a freelance archaeologist, writer and lecturer and formerly Senior Archaeologist for Stoke-on-Trent City Council and Keeper of Archaeology at the City Museum & Art Gallery, Stoke-on-Trent and author of *William Greatbatch – a Staffordshire Potter*. His talk focused on the story of English Red-bodied Ware during the 18th and 19th centuries, whether in stoneware or earthenware bodies. "Red Earthenware Production in the Massachusetts Bay" by Steven R. Pendery, Acting Branch Chief, Archeology, Heritage Preservation, Planning & Compliance, National Park Service, Northeast Region, Lowell, Massachusetts and the former Boston city archaeologist. "From Lard Pots to Teapots: Hervey Brooks, Thomas Crafts, and the Making of Redware in Rural New England" by Nan Wolverton, a Museum and Decorative Arts Consultant specializing in the study of the material culture of New England and is the President of the China Students' Club of Boston. "Art in Clay: North Carolina Moravian Pottery" by Johanna M. Brown, Curator of Moravian Decorative Arts and Director of Collections, Old Salem Museums and Gardens, Winston-Salem, North Carolina. "Long Island Redware" by Anthony Butera, a collector and contributor to *Ceramics in America*, who focused on recent research on pots and potters of Huntington, Long Island. "The Union Village, Ohio, Shaker Pottery, 1811-1852" by Greg Shooner who is licensed by a number of major museums to recreate redware examples from museum collections. He follows traditional techniques including the use of lead glazes to make his wares as authentic as the originals. In his lecture he noted that beginning with the production of smoking pipes,

the Shakers produced vast quantities of earthenware for their own use as well as that of "The World." While producing mostly plain and utilitarian ceramics, some examples illustrate great potting skill and regional styles brought to Ohio by converts to the Shaker faith. Another contribution, "Pottery and Piety: Moravian Red Earthenware in Bethlehem, Pennsylvania, 1742-1767," was prepared by Brenda Hornsby Heindl, an independent scholar, potter and proprietor of Liberty Stoneware, North Carolina, specializing in salt-glazed stoneware. Lastly, there was a "Redware Potting Demonstration" by working potters Greg Shooner and his wife Mary from Oregonia, Ohio.

Forthcoming Meeting

The European Association of Archaeologists' 17th annual meeting will be held in Oslo, Norway, 14-18 September 2011. The meeting is organized by the Museum of Cultural History and the Department of Archaeology, Conservation and History, University of Oslo, the Directorate for Cultural Heritage, the Norwegian Institute for Cultural Heritage Research, the Cultural Heritage Management Office of the City of Oslo and the Norwegian Maritime Museum. A National Advisory board and a Scientific committee, with representatives from all sectors of Norwegian archaeology ensure participation and broad support from Norwegian archaeology. One of the scheduled sessions is "Pottery Function and Ceramic Technology: Contributions on the Understanding of Pottery Making Techniques" (Julien Vieugue, Vincent Ard, Louise Gomart and Ekaterina Dolbunova). The Museum of Cultural History and the University of Oslo celebrate their 200 year anniversary in 2011 and the EAA meeting is part of these celebrations. Additional information may be found on the official web site: <http://www.eaa2011.no>

Exhibitions and Symposium

Marajó: Ancient Ceramics at the Mouth of the Amazon is an exhibition at the Denver Art Museum (DAM), Denver, Colorado, USA from 11 June-18 September 2011. Marajó ceramics were adorned in an ornate style with modeled, carved, and painted human faces and figures, reptiles, snakes, and birds, and were used for feasting, ceremonial life, and funerary offerings. The exhibit focuses on the elaborately decorated red, white, and black earthenware ceramics from the people who occupied the Brazilian island of Marajó, located at the mouth of the Amazon River, from A.D. 300/400 to 1300. Despite their artistic sophistication, ancient Amazonian ceramics are largely unknown to the public, and this is the first exhibition devoted to this topic in the United States. These are the hemisphere's earliest known ceramics (ca. 5000 B.C) and archaeology is revealing the remains of large settlements, ancient mound structures, and extensive water management systems. Elaborately decorated ceramics deposited as offerings in ancient Marajó cemeteries attest to the technical skill and artistry of Amazonian potters, and the complexity and sophistication of their cosmology. Ceramics are drawn from the collections of the Denver Art Museum, the Barbier-Mueller Museums of Geneva and Barcelona, the University of Pennsylvania Museum of Archaeology and Anthropology, the

American Museum of Natural History, and private collections. There are also plans for a symposium to be held at the Denver Art Museum, 16-17 September 2011, "Marajó and the Ancient Amazonian World" organized by Margaret Young-Sánchez. *Marajó: Ancient Ceramics from the Mouth of the Amazon* an 88-page catalog of the exhibition is available through the DAM gift shop and distributed by the University of Oklahoma Press (\$25.00). For details on the exhibition, forthcoming symposium, and catalog, visit the museum's Web site at: http://www.denverartmuseum.org/explore_art/temporaryExhibitionDetails/exhibitionId--204117/exhibitionType--Upcoming

The exhibition *Shipwrecked: Tang Treasures and Monsoon Winds* scheduled to travel late this year to the Smithsonian Institution's Sackler Gallery in Washington, DC, has been postponed indefinitely. The catalog accompanying the exhibition was reviewed in the last *SAS Bulletin* 34(2):14-16 (2011): *Shipwrecked: Tang Treasures and Monsoon Winds* (Regina Krahl, John Guy, J. Keith Wilson, and Julian Raby (eds.), with contributions by Alison Effeny, Michael Flecker, John Guy, Jessica Hallett, Hsieh Ming-liang, Regina Krahl, Li Baoping with Chen Yuh-shiow and Nigel Wood, Liu Yang, François Louis, Qi Dongfang, Wang Gungwu, Tom Vosmer, and J. Keith Wilson; Arthur M. Sackler Gallery, Smithsonian Institution, Washington, DC; the National Heritage Board, Singapore; and the Singapore Tourism Board, 2010). Nautical archaeologist James Delgado, commented that "This shipwreck is one of the most significant shipwrecks to be found in modern times" and added that "it is the only shipwreck to date that we have found which has direct archaeological evidence of trade between the Arab world and the Chinese world." www.npr.org The objects are from the Chinese Tang dynasty of the nineteenth century and the boat is thought to be from the Middle East. Several archaeologists pointed out that these artifacts were obtained illegally beginning in 1998 when local fishermen diving for sea cucumbers found the vessel and its cargo off the island of Belitung in Indonesia. Part of the controversy is because not all the pieces have been returned to the proper authorities and "many were stolen and sold on the Internet." The Indonesian government has engaged Seabed Explorations, a German recuperation firm to find the stolen works, the bulk of which were subsequently bought by the Singaporean government for \$32.0 million (US). An investigation has begun to locate the missing objects and identify the perpetrators.

At the Arthur M. Sackler Gallery, Smithsonian Institution, Washington, DC, USA are two noteworthy exhibitions. "*Ancient Iranian Ceramics*" opened 16 July 2011 and continues into 2010. Some 3,000 years ago, in the area south of the Caspian Sea in what is now modern Iran, craftsmen developed a distinctive type of pottery. This small installation features some of the outstanding treasures in the Sackler Gallery's collection of ancient Iranian ceramics. It celebrates the talents of ancient Iranian potters, and showcases the high quality of their crafted works. "*Reinventing the Wheel: Japanese Ceramics 1930-2000*" opened 23 July 2011. Modern and contemporary Japanese ceramics were among the first of many new directions in collecting made possible by the opening of the Sackler Gallery in 1987. Today, the Sackler

collection represents significant trends in Japanese ceramics since the 1930s, when traditional workshop masters took on new roles as studio potters alongside artists in other media. Potters at regional kilns revived ancient firing and glazing technology for use in expressive new vessel forms. In postwar Kyoto, ceramic artists departed from conventional ideas of function to create sculptural forms. Today's potters sample at will from these trends, blending meticulous skill with daring reinterpretations of shapes and materials. This installation of highlights spans legendary "Living National Treasures" to young virtuosos of the present day. See <http://www.asia.si.edu/exhibitions/> for more information.

Online Resources

Whittington Collection of Asian Ceramics. In 1987, Floyd and Carol Whittington donated more than 200 pieces of Asian ceramics to Western Washington University, Bellingham, WA 98225, USA. This collection represents a wide range of styles and ceramic traditions from China, Thailand, Korea, and Vietnam. The Western Washington University Libraries Special Collections group digitized images of these items, and visitors can search the items by geographic category or a descriptive term, such as stoneware or porcelain or browse through items by looking at thumbnail images. First-time visitors should look at the Bencharong footed dish from Thailand and a Chinese plate with grooved cavetto. See http://content.wvu.edu/cdm4/index_wcac.php?CISOROOT=/wcac for additional information.

Ethnoarchaeology: Mitra Videos. Video Resources On The Net contains a list of videos from Google, Youtube, and Amazon about ethnoarchaeology and includes videos on ceramic ethnoarchaeology (a majority are less than five minutes), <http://videos.mitrasites.com/ethnoarchaeology.html> among these are: "paddle and anvil technique," "coiling a pot on a turntable," "potter making clay items," "open firing of pottery," "mud missive," "how to make clay bowls," "sawdust fired ceramics," "wood fired pottery firing," "Kimberli pottery," "pottery demo (Marginea, Romania)," "Sri Lankan pottery decoration," "Fairport pottery," "firing ancient earthen ware pottery," "Ethiopian ethnoarchaeology," "potters of San Marcos," "traditional women potters of the Volta, Ghana," "la cerámica raku," "Maria Martinez pottery of Santa Clara," "Damili pottery," "Korean Onggi potter" (9:45) and "firing Ongii kiln." New materials are constantly being added.

ARCHAEOLOGICAL METALLURGY

Thomas R. Fenn, Associate Editor

The column in this issue includes the following categories of information on archaeological metallurgy: 1) New Books; 2) New Articles/Book Chapters; 3) Previous Meetings; 4) Forthcoming Meetings; and 5) Web Resources

New Books

Metallographie - Grundlagen und Anwendung, by Georg Salbert, 2010, Materialkundlich-Technische Reihe, Band 14, Gebrüder Borntraeger, Stuttgart, ix+155p., 159 figures, 21x15cm, Language: German, ISBN: 978-3-443-23017-3, Price: €29.90. Details from the publisher can be found at the following link: <http://www.schweizerbart.de/publications/detail/isbn/9783443230173>.

Metallography deals with the macroscopic and microscopic structural examination of metallic materials. As a re-emerging field of materials technology, it has a high priority, both as training material and for professionals in the practice of material production, processing and testing. This book is a modern and compact presentation of the practice of the preparation of metal samples for structural studies. It describes important macroscopic and microscopic methods for the analysis of ferrous materials and nonferrous metals such as copper, aluminum and titanium alloys.

Using typical micrographs correlations between structure and material composition on the one hand and the technological treatment of the material are described on the other. The structure will be explained and the structural components identified. The presented micrographs can be used by the reader as a model for interpreting structure in their own specimens. The comparison of micrographs can be under the influence of each material treatment seen in the microstructure. The training of the primary structure during solidification and the structural transformations during cooling of the alloys used are discussed with the help of state diagrams. Treated for a variety of ferrous materials and nonferrous metals, tensile strength and other functional properties, which are a consequence of the microstructure and determine the application of specified materials.

The book is divided into the following sections: specimen preparation, macroscopic examination cut, fabric unalloyed iron-carbon materials and structures of selected non-ferrous metals. Each chapter concludes with a practical part. This exercise should be suggested to strengthen the theoretical basis of the learner and improve his practical knowledge about the structure and interpretation of laboratory skills. The book is designed to prepare trainees material experts on self-employment in material testing. It is aimed primarily at trainee materials tester, metallographers and students of material science. It can also be used as a handle for students of mechanical, production engineering, as well as for prospective business school teachers and not least as a reference book used for practicing material scientists.

"All that glitters...: The Belgian Contribution to Greek Numismatics" / «Ο,τιλάμπει...: Η βελγική συνεισφορά στην ελληνική νομισματική», edited by Panagiotis P. Iossif, 2010, Belgian School at Athens, Athens, 105p., 43 figures + catalog, Language: English/Greek, ISBN: 978-960-99428-0-5.

This publication represents the catalog to the exhibition at the Numismatic Museum at Athens, from September 29, 2010, to January 15, 2011, organized by the Belgian Embassy in Greece, the Belgian School at Athens (EBSA), the Royal Library of Belgium (KBR) and the Numismatic Museum at Athens. Following several short introductory notes, the editor provides a brief chapter "Introducing the exhibition 'All that glitters...'" (Panagiotis P. Iossif; pp. 18-25). This is followed by chapters on the history and archaeometallurgy of Thorikos, an important ancient mining community near Laurion in the southern Attica peninsula, Greece. These chapters consist of "Thorikos Rich in Silver: the prehistoric periods" (Robert Laffineur; pp. 26-40), "The Early Iron Age at Thorikos" (Koen Van Gelder; pp. 41-43), "Thorikos: A picture in pottery" (Roald Docter, Patrick Mansieur, Margarita Nazou, Winfred van de Put, Koen Van Gelder; pp. 44-51), and "Thorikos and the Industrial Quarter: A mine of information on the silver industry of ancient Attica" (Roald Docter and Kim Van Liefferinge; pp. 52-59). These chapters are followed by a series of numismatic chapters on Greek coinage associated with the exhibition, comprising "The monetary hoard 'Thorikos 1969' (IGCH 134)" (Jean Bingen; pp. 60-67), "The Tell el-Maskhuta Hoard of Athenian Tetradrachms (IGCH 1649)" (Christophe Flament; pp. 68-81), "The Brussels tetradrachm of Aitna: possibly the most precious ancient coin of the world" (François de Callataÿ; pp. 82-91), and the "Catalogue of coins and dies in the Aitna showcase: *the Aitna world*" (François de Callataÿ, Panagiotis P. Iossif; pp. 92-97). This is followed by a Bibliography and Catalogue of Authors.

Technik in der Antike, by Brigitte Cech, 2010, WBG Historischen Bibliothek series, WBG (Wissenschaftliche Buchgesellschaft), Darmstadt, Germany, 256p. (hbk.), 134 figures, 18 tables, 17x24cm, Language: German, ISBN: 3-8062-2080-8, 978-3-8062-2080-3, Price: €29.90. This book covers the main aspects of ancient technology in twelve chapters: Sources (pp. 11-17); Basics of technology in antiquity (pp. 18-23); Metrology (time and land) (pp. 24-34); Tunneling (pp. 35-44); Architecture (pp. 45-79); Road- and bridge building (pp. 80-93); Water (pp. 94-144); Food production (pp. 145-154); Ship building (pp. 155-178); Mining and beneficiation (pp. 179-190); Smelting and alloying (pp. 191-203); Military (pp. 204-214); Appendices (pp. 215-238); References (pp. 239-250); Index (pp. 251-255).

Thilo Rehren (London) provided the following synopsis. *Technik in der Antike* is lavishly illustrated with purpose-made art work and colour photographs throughout. For the readers of this web site, the chapters on mining and metallurgy are probably most relevant, and I will focus on these only. The section on mining covers prospection, developments of deposits, actual mining methods, from fire setting to hydraulic mining (Roman in particular), hauling, ventilation and lighting, and the use of slaves in mining. For beneficiation, the examples from Laurion (classical Greek) and Mazarron (Spain, Roman) are presented in some detail. The chapter on smelting begins with a basic coverage of smelting principles, and then goes on to cover lead-silver, copper, tin, mercury, and gold. Iron smelting and smithing are covered, too, as are various copper-based alloys such as brass and Corinthian aes.

The text provides an excellent overview of the basics, while the references (arranged by chapter, and without specific citation in the text) provide an entry for further reading. The book is clearly aimed at a wider public, but is very suitable for undergraduate students and scholars who need a quick entry into a subject outside their own specialisation. I liked particularly the even coverage of subjects and metals, giving a more balanced view than some other similar books do. It is to be hoped that an English-language edition will be available soon.

New Book Chapters/Articles

From the *Proceedings of the 37th International Symposium on Archaeometry, 12th – 16th May 2008, Siena, Italy*, edited by Isabella Turbanti-Memmi, Springer, London/New York, 2011, comes “Ceramic Production and Metal Working at the Trebbio Archaeological Site (Sansepolcro, Arezzo, Italy)” (E. Gliozzo, A. Comini, A. Cherubini, A. Ciacci, A. Moroni, and I. Turbanti Memmi; pp. 61-69), “Middle Guadiana River Basin (Badajoz, Spain and Alentejo, Portugal) Network Interactions: Insights from the Chemical Analysis of Bell Beaker Pottery and the Lead Isotope Analysis of Copper Items from the Third Millennium BC” (C. P. Odriozola, M. A. Hunt-Ortiz, M. I. Dias, and V. Hurtado; pp. 119-125), “XRF Analyses of Four Silver Gilded Hellenistic Epauettes” (E. Asderaki-Tzoumerkioti and A. G. Karydas; pp. 569-574), “The Use of Industrial Computed Tomography in the Study of Archaeological Finds” (A. Berdondini, R. Brancaccio, V. D’Errico, A. Miceli, M. Bettuzzi, F. Casali, M. P. Morigi, M. Senn, and A. Flisch; pp. 575-578), “Arabic Coins as a Silver Source for Slavonic and Scandinavian Jewellers in the Tenth Century AD” (N. Eniosova and R. Mitoyan; pp. 579-584), “Neutron-Based Analytical Methods for the Non-Invasive Characterisation of Iron Artefacts” (E. Godfrey and W. Kockelmann; pp. 585-590), “Corrosion Studies and Lead Isotope Analyses of Musket Balls from Scottish Battlefield Sites” (A. J. Hall, R. Ellam, L. Wilson, T. Pollard, and N. Ferguson; pp. 591-597), “Non-Destructive and Minimally Invasive Analyses of Bronze Seal Boxes from *Augusta Raurica* by Micro X-Ray Fluorescence Spectrometry, Raman Spectroscopy and FTIR Spectroscopy” (K. Hunger, E. Hildbrand, V. Hubert, M. Wörle, A. R. Furger, and M. Wartmann; pp. 599-604), “A Multi-Disciplinary Approach to the Study of An Assemblage of Copper-Based Finds Assigned to the Prehistory and Proto-History of Fucino, Abruzzo, Italy” (M. L. Mascelloni, G. Cerichelli, and S. Ridolfi; pp. 605-610), “Copper-Based Kettles from Brador: A Contribution to the Study of Eastern Settlements of New France on the Northern Shore of the Estuary of the Saint-Lawrence (Quebec, Canada)” (J.-F. Moreau and R. G. V. Hancock; pp. 611-616), “On the Gold Adornments from Apahida-Fifth Century AD, Transylvania, Romania” (G. Niculescu, R. Oantă-Marghitu, and M. Georgescu; pp. 617-622), “Non Destructive In Situ Analysis of Gold and Silver Artifacts from Tomb 7 of Monte Alban, Oaxaca, Mexico” (G. Peñuelas, J. L. Ruvalcaba, J. Contreras, E. Hernández, and E. Ortiz; pp. 623-627), “‘‘Harvesting’’ the Ore: The Use of Iron Seepages in the Early Bloomery Furnace in Ireland” (E. Photos-Jones and A. J. Hall; pp. 629-635), and

“Analysis of Gold Jewellery by PIXE and SEM-EDS: A Comparison of Ancient and Modern Productions” (V. Virgili and M. F. Guerra; pp. 637-641).

From the *Journal of Archaeological Science* (2011, Vol. 38, No. 9) comes “Archaeometallurgical study of the brass cases from the Akko 1 shipwreck” (D. Ashkenazi, D. Cvikel, N. Iddan, E. Mentovich, Y. Kahanov, M. Levinshstein; pp. 2410-2419), and (2011, Vol. 38, No. 8) “The metal compositions of a series of Geistingen-type socketed axes” (H. Postma, P. Schillebeeckx, W. Kockelmann; pp. 1810-1817), and (2011, Vol. 38, No. 7) “Metallurgical analysis of copper artifacts from Cahokia” (Matthew L. Chastain, Alix C. Deymier-Black, John E. Kelly, James A. Brown, David C. Dunand; pp. 1727-1736), “Making sense out of cents: compositional variations in European coins as a control model for archaeometallurgy” (S. S. Shilsteina, S. Shalev; pp. 1690-1698), “Specialization and social inequality in Bronze Age SE Arabia: analyzing the development of production strategies and economic networks using agent-based modeling” (Lynne M. Rouse, Lloyd Weeks; pp. 1583-1590), and (2011, Vol. 38, No. 6) “A study of the Roman iron bars of Saintes-Maries-de-la-Mer (Bouches-du-Rhône, France). A proposal for a comprehensive metallographic approach” (G. Pagès, P. Dillmann, P. Fluzin, L. Long; pp. 1234-1252), “Provenance of Early Bronze Age metal artefacts in Western Switzerland using elemental and lead isotopic compositions and their possible relation with copper minerals of the nearby Valais” (Florence Cattin, Barbara Guénette-Beck, Philippe Curdy, Nicolas Meisser, Stefan Ansermet, Beda Hofmann, Rainer Kündig, Vera Hubert, Marie Wörle, Kathrin Hametner, Detlef Günther, Adrian Wichser, Andrea Ulrich, Igor M. Villa, Marie Besse; pp. 1221-1233), and “Large-scale 2nd to 3rd century AD bloomery iron smelting in Korea” (Jang-Sik Park, Thilo Rehren; pp. 1180-1190).

From *Archaeometry* (2011, Vol. 53, No. 1) comes “An Experimental Investigation on Lead Isotopic Fractionation during Metallurgical Processes” (Jianfeng Cui, Xiaohong Wu; pp. 205-214), while from *Archaeological and Anthropological Sciences* (2011, Vol. 3, No. 2) comes “The ancient Greek names “Magnesia” and “Magnetes” and their origin from the magnetite occurrences at the Mavrovouni mountain of Thessaly, central Greece. A mineralogical–geochemical approach” (Vasilios Melfos, Bruno Helly, Panagiotis Voudouris; pp. 165-172), and from *Ancient Mesoamerica* (2010, 21) comes “God of metals: *Tlatlahuqui Tezcatlipoca* and the sacred symbolism of metallurgy in Michoacan, Mexico” (Hans Roskamp; pp. 69-78), and “A Mazapa phase copper figurine from Atetelco, Teotihuacan: data and speculations” (Dorothy Hosler and Ruben Cabrera; pp. 249-260).

From *X-Ray Spectrometry* (2011, 40) comes “The metal alloy of the boy from Xanten” (A. Denker, Z. Kertesz, U. Peltz; pp. 215-218), while from *Zeitschrift für Waffen- und Kleidungsgeschichte* (2010, 52, 1), comes “Sword parts from a Viking Age Emporium of Truso in Prussia” (M. Biborski, M. E. Jagodziński, P. Pudło, J. Stepiński, G. Zabiński; pp. 19-70), and from *Journal of Microscopy* (2010, 237, 3), comes “An investigation of nitride precipitates in archaeological iron

artifacts from Poland” (Z. Kędzierski, J. Stępiński, A. Zielińska-Lipiec; pp. 271-274). From the *Journal of Radioanalytical and Nuclear Chemistry* (2010, 283, 3) comes “Non-destructive bulk analysis of the Buggenum sword by neutron resonance capture analysis and neutron diffraction” (H. Postma, L. Amkreutz, A. Borella, M. Clarijs, H. Kamermans, W. Kockelmann, A. Paradowska, P. Schillebeeckx, D. Vissar; pp. 641-652), while from the journal *Gladius* (2009, 29) comes “Contribution to the history of technology and weaponry: experimental forging of arrowheads using ancient iron bars” (G. Renoux, F. Dabosi, P. Lavaud; pp. 39-70), and from *Materials Science Forum* (2010, 652) comes “Non destructive characterisation of phase distribution and residual strain/stress map of two ancient (Koto) age Japanese swords” (F. Grazzi, L. Bartoli, F. Civita, A. M. Paradowska, A. Scherillo, M. Zoppi; pp. 167-178).

Forthcoming Meetings and Conferences

The International Centre for Chinese Heritage and Archaeology (ICCHA), the Institute of Archaeology, University College London, Peking University and Baoji Municipal People’s Government, Shaanxi province, China, invite scholars to participate in the conference *The Emergence of Bronze Age Societies: A Global Perspective* to be held from November 8-12, 2011, at the Baoji Museum of Bronze, Shaanxi, China.

The conference aims at enhancing our understanding of the background and development of Bronze Age societies on a global scale. It will trace the beginnings of the use of copper and bronze throughout Eurasia and beyond, and investigate the societies that developed metallurgy. Questions to be raised are: What constitutes a Bronze Age? Which characteristics share early bronze using cultures? Is the use of bronze sufficient to define a Bronze Age society? What kinds of artefacts were predominantly produced? Which technological solutions were found in different bronze-using cultures to source raw materials and to produce alloys and artefacts? What was the role of cross-cultural exchange in the development of Bronze Age societies? The conference especially seeks to provide a platform for integrating the achievements of Chinese archaeological research on the Bronze Age into a world wide context. For this reason the conference will be held in Baoji, Shaanxi province, China, where a major bronze producing centre was located 3000 years ago, and where one of the largest collections of bronze artefacts in all of Asia is stored.

The conference will be held from 08 to 12 November 2011. The costs of local accommodation and conference fees will be met by the organisers. Foreign participants are responsible for their travel and visa costs. The deadline for the submission of abstracts is January 31, 2011. Successful candidates are expected to give a talk of 15 minutes and to present a poster of their research during a poster session. Individual posters are welcome as well. Conference languages: English/Chinese with translation. The conference proceedings will be published as a peer-reviewed volume. For more information see: <http://www.ucl.ac.uk/archaeology/calendar/articles/20101217>

The N.C.S.R. “Demokritos”/Institute of Materials Science and the National Technical University of Athens (NTUA)/Department of Chemical Engineering are organizing an International Symposium on the “*History, Technology and Conservation of Ancient Metals, Glasses and Enamels*”, to be held November 16-19, 2011, in Athens, Greece. The Symposium is expected to be an interdisciplinary meeting of researchers, scientists, archaeologists, conservation scientists and executives who are involved in the history, technology and conservation of ancient materials in Greece and the adjacent areas. The official language of the Symposium will be English. The deadline for submission of abstracts has been extended until Friday, July 15, 2011. More information can be found at: <http://www.ims.demokritos.gr/gme2011/>.

Previous Meetings and Conferences

The *Society for American Archaeology* annual meeting was held March 30-April 2, 2011, in Sacramento California. A number of presented papers and posters relating to historic and ancient mining, metallurgy and metallic mineral use were presented. These included “XRF Analysis on Ancient Copper from a Great Kiva in the Central Mesa Verde Region” (Steve Copeland), “Archaeological Investigation of the Thule Sequence at Cape Espenberg, Alaska” (Jeremy Foin, Christyann Darwent and Frederic Dussault), “Arrowheads and Projectile Points from the Ancient Middle East: Indicators of Regional Metalworking Tradition and Imposed Imperial Demand” (Elizabeth Friedman, Lynn Swartz Dodd, Carlo Segre, Sarah Butler and Jon Almer), “Framing the Sacred: Craig Mound Sacred Bundles” (Elizabeth Horton and George Sabo, III), “New Standards in the Analysis of Archaeological Metalwork using LA-ICP-MS: A Case Study from the South Caucasus Archaeometallurgy Project” (Clayton Meredith, Monica Tromp, David Peterson, John Dudgeon and Khachatur Meliksetian), “Mining Archaeology in the Nasca and Palpa region, south coast of Peru” (Markus Reindel and Thomas Stoellner), “Crafting Resonance: Third Millennium BC Copper Arrowheads from Ganeshwar, Rajasthan” (Uzma Rizvi), “The organization of copper mining during the Late Period in the Loa River (northern Chile)” (Diego Salazar, Hernán Salinas, José Berenguer and Diego Morata), “Mining of copper and copper-bearing minerals in ancient Peru: New evidence from the Upper Ica Valley” (Hendrik Van Gijsegheem, Kevin Vaughn, Verity Whalen, Moises Linares Grados and Jorge Olano Canales), “Piecing together a history of goldworking in Pre-Columbian Panama: the XRF contribution” (Harriet Beaubien, Ainslie Harrison, Kim Cullen Cobb and Richard Cooke), “Amalgamation and Small-Scale Gold Mining in the Ancient Andes” (William Brooks), “Ancient Yunnan Metals in Current Studies of Bronze/Iron Age Asia” (TzeHuey Chiou-Peng), “Crafting Continuity: Delineating (Social) Actions in Metal Artifacts” (Praveena Gullapalli), “Forging Social Relations, Producing Metals: Investigating Scale and Context in the Socio-material Landscape of Iron/Steel Production in Iron Age Karnataka” (Peter Johansen), “Metallurgical responses to Deforestation: Alloy sequencing and environmental proxy data from the EBIV-MBII Southern Levant” (Brett Kaufman), “On the cutting edge? Obsidian and Iron Use and Exchange in Pre-Islamic Highland Yemen”

(Lamy Khalidi, Krista Lewis, Bernard Gratuze and H. Xander Veldhuijzen), "Innovations in technology and political economy during the Central Anatolian Iron Age" (Joseph Lehner), "Methods for the Analysis of Ancient Coins" (Brandi Lee MacDonald, Fiona McNeill, Michael Farquharson, Diane de Kerckhove and Spencer Pope), "Reassessing the "Ceremonial Plaza" on the North Coast of Peru" (Go Matsumoto and Izumi Shimada), "Silver Mines of the Northern Lake Titicaca Basin, Peru" (Carol Schultze), "The Metallurgy of Iron Mine Hill: The Economic Implications of the Use of Cumberlandite in Colonial Era Iron Artifacts from Rhode Island" (Alexander Smith and Danielle Raad), "Geoarchaeological and paleoenvironmental archives of ancient cinnabar mining in the Andes" (Colin Cooke), "Comparison of Miner Encampments in the Black Range Mountains, New Mexico" (Aben, Kathrina), "Hunter-Gatherer-Fisher Mining during the Archaic Period in Coastal Northern Chile" (Hernan Salinas, Diego Salazar, Jean-Louis Guendon, Valentina Figueroa and Donald Jackson), "Attempts to stabilize Archaeological Iron Objects: A Moessbauer Study" (Ursel Wagner, Thibault Demoulin, Rupert Gebhard, Werner Haeusler and Cristina Mazzola), "Inca Mining and Control in North-Central Chile: The Los infieles Mining Complex" (Gabriel Cantarutti), "The Structure and Organization of Mining in Nasca from the Early Intermediate Period through the Middle Horizon: Recent Evidence from Mina Primavera" (Kevin Vaughn, Hendrik Van Gijsegem, Jelmer Eerkens and Moises Linares Grados), "Sourcing Homol'ovi I Turquoise Through Lead and Strontium Isotopic Analyses" (Saul Hedquist, Alyson Thibodeau, E. Charles Adams and David Killick), "Determining the source of turquoise at Pueblo Bonito, Chaco Canyon, New Mexico" (Alyson Thibodeau, John Chesley and Joaquin Ruiz), "Turquoise Procurement and Exchange Patterns between Three Ancestral Puebloan Great Houses" (Sharon Hull, Mostafa Fayek and F. Joan Mathien), and "The way to make a mirror, an experimental archaeology project" (Emiliano Gallaga). The abstracts for these papers can be found at: <http://www.saa.org/AbouttheSociety/AnnualMeeting/2011abstracts/tabid/1440/Default.aspx>.

The workshop *Marking Coin Issues: Mint Administration and Mint Archives in Antiquity*, was held May 13, 2011 at the Lucien de Hirsch-Conference Room in the Coin Cabinet of the Royal Library, Brussels, Belgium. Contact Johan van Heesch <johan.vanheesch@kbr.be> or François de Callatay <callatay@kbr.be> for more details.

The meeting "*Indices et traces : la mémoire des gestes*" : *Colloque international à la Faculté d'Odontologie*, was held Thursday, June 16 to Saturday, June 18, 2011, at the Faculté d'Odontologie, Nancy-Université, Université Henri Poincaré, Nancy, France. This international conference, organized by the Professors Francis Janot, Gerard Giuliano and Doctor Denis Morin, in partnership with the HISCANT-MA Laboratory of the University of Nancy 2, the University Institute of France, and the Laboratory of Archaeology TRACES (UMR 5608), aimed at gathering specialists in disciplines interested in the analysis and interpretation of macroscopic and microscopic traces left by human activity through any support, as well ecological, biological, as archaeological and data-processing.

Presentations of archaeometallurgical interest included "Les techniques d'exploitation des ressources minières dans l'Antiquité: Restitution des techniques d'aéragage et d'extraction d'après l'analyse des traces" (Denis Morin, Richard Herbach), "Prehistoric metallurgy and smelting. Archeometallurgical traces and evidence from peat bog sediments cores in the British Isles: Archaeology of the sites, the dating and recent Bayesian modelling of the dates, and the scientific studies on the types of ores worked in prehistory" (Simon Timberlake), "Paleoenvironmental work (pollen and geochemistry and their implications carried out at the sites of Bronze Age and Roman mining and smelting) in Wales" (Timothy Mighall), "Exploitations anciennes et récentes de formations superficielles : minières, sablières, gravières" (Dominique Harmand, Jean-Paul Fizaine, Simon Edelblutte), and "Prehistoric mining : geochemical traces and evidence from sediment core at Mynydd Parys, Anglesey" (David A. Jenkins). More aspects of the colloquium and presented papers can be found at the following link: http://www.uhp-nancy.fr/recherche/colloques_et_congres/indices_et_traces_la_memoire_des_gestes_colloque_international_a_la_faculte_d_odontologie.

The 3rd *International Conference "Archaeometallurgy in Europe" 2011*, was held from June 29-July 1, 2011 at the Deutsches Bergbau-Museum, Bochum, Germany. This represents the third such conference in the "Archaeometallurgy in Europe" series, and this was by far the largest so far with three concurrent sessions of oral presentations being given over the three days of the conference. Several excursions also were included in the program with the highlight being a visit on the final day of the conference to a former modern iron production site with several large intact furnaces still present. The program and abstracts from the conference were published in a special issue of *Metalla (Bochum)*. Details of that issue are as follows: *International Conference Archaeometallurgy in Europe III: Abstracts*, edited by Andreas Hauptmann, Diana Modarressi-Tehrani and Michael Prange, 2011, *Metalla*, Sonderheft 4, Deutsches Bergbau-Museum Bochum, Germany, 294p., ISSN: 0947-6229.

Papers presented on Wednesday, June 29th, consisted of "New Approaches in Isotope Archaeometallurgy" (E. Pernicka), "Accurate Highres Lead Isotope Ratio Maps of Germany for Provenience Studies" (R. Lehmann, C. Vogt), "Radiocarbon Dating Of Ancient Iron Alloys By AMS" (S. Leroy, Ph. Dillmann, E. Delqué-Koli, C. Moreau), "Historical steel from Japan, India and Ottoman Turkey: a non invasive comparative study through Time of Flight Neutron Diffraction" (Alan Williams, Francesco Grazzi, Francesco Civita, Antonella Scherillo, Elisa Barzagli, Laura Bartoli, David Edge, Marco Zoppi), "West European Bronze Age gold ornaments: first results of a combined analytical and technological approach" (B. Gratuze, B. Armbruster, M. Blet-Lamarquand, J. F. Pinigre), "Early mining settlement at the Great Copper Mountain, Falun, Sweden: a geoecological study of lake sediment records" (R. Bindler, J. Karlsson, F. De Vleeschouwer), "Finding the invisible smelt: using new attributes to find the furnace" (T. Birch, B. Cech, R. Scholger, G. Walach, F. Stremke), "3D model of slag heap based on

induced polarization at Castel-Minier (France): a way to quantify iron production?" (M. Llubes, N. Florsch, F. Téreygeol), "Neolithic and Early Bronze Age Metallurgy – First Results of X-Ray Diffraction Experiments on Copper and Bronze Axes" (M. Freudenberg, L. Glaser), "Metallurgical innovation in early metallurgy in Europe: from the Neolithic to the Medieval period" (M. Pearce), "How and Why: The Beginnings of Metallurgy in Europe" (M. Radivojević, Th. Rehren, E. Pernicka, D. Šljivar, J. Kuzmanović-Cvetković, N. Tasić, Lj. Jevtić, A. Pravidur), "The diversity and similarity of chemical and typological features of halberds as a measure for identifying metallurgical innovation areas in Early Bronze Age Europe" (K. Rassmann, R. Gauß), "The Development of Metallurgy in Apulia from the Beginning of the Copper Age to the End of the Bronze Age" (A. M. Bietti Sestieri, C. Giardino, M. Gorgoglione), "The evolution of metallurgy in Pre-Protohistoric Northern Italy during the Early Bronze Age: Investigation on finds from Trentino and Emilia-Romagna" (I. Angelini, R. C. Marinis, I. Giunti, G. Artioli), "Copper networks at the beginning of the Early Bronze Age in the Northalpine area: compositional data from Singen am Hohentwiel (Germany) and the Central Valais (Switzerland)" (F. Cattin, M. Merkl, C. Strahm, I. M. Villa, P. Degryse), "Production techniques of gold objects from Varna Chalcolithic Necropolis and the growing social complexity in the 5th millennium B.C." (K. Dimitrov, I. Kulev), "The origin and spread of iron objects and metallurgy on the Iberian Peninsula" (D. P. Mielke), "Iron - A Driving Force for Early Urbanisation" (H. Andersson), "Rethinking the origins of metallurgy in the central Mediterranean" (A. Dolfini), "Learning from ancient metallurgical technologies in Colombia. The study of surface treatment techniques" (N. Bustamante, G. Rojasb, J. Escobar, S. Archilad), "Prehispanic Gold Metallurgy: The Arqueomeb Research Project" (A. Perea, P. Fernández-Esquivel, S. Rovira-Llorens, J.L. Ruvalcaba-Sil, A. Verde, O. García-Vuelta, F. Cuesta-Gómez), "The smelting site of Kobo (Mali): a quantitative approach" (S. Perret), "New Fieldwork Results from Smelting Sites in Mali and Burkina Faso" (V. Serneels), "An Assessment of the Role of Tunisian Ores in Local Metal Consumption during Punic and Roman Times" (T. R. Fenn, S. Skaggs, D. Killick, E. Garrison, N. Norman, S. Bouhlel, J. Ruiz), "Slags and 'Slags' - The Metallurgical Inventory from Tel Mique" (K. Franke, Th. Rehen, S. Gitin), "New Evidence for Iron Production in the Iron Age of the Levant" (A. Eliyahu-Behar, N. Yahalom-Mack, Y. Gadot, I. Finkelstein, S. Weiner), "Deconstructing the chaîne opératoire of the copper industry in Arisman, Central Iran" (B. Helwing), "Large-scale speiss production in Early Bronze Age Arisman, Iran" (L. Boscher, Th. Rehren, E. Pernicka), and "Investigation on pre-Islamic coins from Sumhuram (southern Oman): first results" (L. Chiarantini, M. Benvenuti, A. V. Sedov, A. Avanzin, A. Pavan).

Papers present on Thursday, June 30th, consisted of "Roman Copper - A Study of Coins, Ingots, and Ores based on modern chemical and isotope analysis" (S. Klein), "Augustus' gold coinage: mints and gold provenance" (M. Blet-Lamarquand, A. Suspène, M. Amandry), "Anglo-Saxon Warrior Gold" (D. Hook, S. La Niece, G. Williams), "High Medieval copper, lead and silver from the Rammelsberg near Goslar, Germany" (B.

Asmus), "Silvering process in the Holy Roman Empire: coin study from a hoard of the 16th century found in Alsace (France) and archaeometallurgical replications" (L. Beck, E. Alloin, A. Michelin, F. Téreygeol, C. Berthier, D. Robcis, T. Borel, U. Klein), "Silver Plated Mycenaean Bronze Artifacts - Burial Offerings from the Tholos and Chamber Tombs at the Region of Pylos in Peloponnese" (C. Tselios, E. Filippaki, Y. Bassiakos, G. Korres), "Archaeometallurgical research at the tell Çukuriçi Höyük/Western Turkey" (M. Mehofer), "Copper-based metals from El Calvari (Tarragona, Spain): local ores, imported ingots or object trade?" (X.-L. Armada, R. Graells, M. Hunt, I. Montero-Ruiz, M. Murillo-Barroso, N. Rafel, M. Renzi, M. Carne Rovira), "Technical Studies on the LM I Copper-based Finds from Gournia, Crete" (A. Giunlia-Mair, S. Ferrence, P. P. Betancourt), "Bronze Age defensive armour in Hungary: new aspects of manufacture" (M. Mödler, Z. Kasztovszky, V. Szilágyi, P. Piccardo, A. Kocsonya, I. Kovács, Z. Szökefalvi-Nagy, Z. Sánta), "Chemical Composition of Fibulae from Iron Age in Thrace (Bulgaria)" (V. Bonev, B. Zlateva, I. Kuleff), "Roman Bronze Statues from the UNESCO World Heritage Limes" (F. Willer, R. Schwab, K. Bott), "Research in Siegerland region/Germany: Preliminary results of surveys, excavations and archaeometallurgical studies about production of iron during the La Tène period" (T. Stöllner, M. Zeiler, Ü. Yalçın), "Reconstructing ancient technologies" (D. Killick), "Portable XRF - Possibilities and limitations" (D. Böhme), "From the single piece to serial production – notes on improvements in fine metal working technology (third millennium BC – first millennium AD)" (B. Armbruster), "Precious metalwork from the Viking age – the manufacturing of the Hiddensee jewellery" (H. Eilbracht, B. Armbruster, M. Radtke, I. Reiche), "Some thoughts on the interpretation of elemental compositions of Chalcolithic copper finds" (M. B. Merkl), "Observations on technology of Bronze Age copper and copper alloy finds from Bulgaria" (S. Ivanova, I. Kuleff, V. Rangelova), "Metal Technology at Akrotiri on Thera: analytical studies on metallurgical implements and by-products" (Y. Bassiakos, A. Michailidou), "Ancient brasses: misconceptions and new insights" (D. Bourgarit, N. Thomas), "Reconstruction of the Lombard Fibula from Arcisa" (A. Pacini), "The fusion welding process: a study of the joining techniques used on the Greek and Roman Large Bronze Statues" (A. Azéma, B. Mille), "The Bronze Age crucibles from Iolkos – Palaio Kastro, Volos – a contradiction of form and function?" (Th. Rehren, E. Asderaki, E. Skafida), "Material properties of pyrotechnical ceramics used in the Bronze Age Aegean and implications on metallurgical technologies" (A. Hein, I. Karatasios, N. S. Müller, V. Kilikoglou), "Copper Slags and Crucibles of Copper Metallurgy in The Middle Bronze Age Site (El Argar Culture) of Peñalosa (Baños de la Encina, Jaen, Spain)" (S. Rovira, M. Renzi, A. Moreno, F. Contreras), "Tinned Bronzes and Gold Granulation Artifacts Found in North West China and Mediterranean Area before 221 BC – Preliminary Technical and Archaeological Considerations" (H. Wie), "The Southeast Asian Lead Isotope Project: Towards Geochemical Proxies for Local, Regional, and Inter-Regional Social Interactions c. 1000 BCE to c. 500 CE" (O. Pryce), "Golden Hair Ribbons from the Royal Tombs of Ur, 600/500 BCE" (A. Hauptmann, Dirk Kirchner, Sabine Klein, Richard Zettler), "Old World Mining Between Technological Innovation, Social Change and

economical structures" (Th. Stöllner), "Drainage Water Wheels from Alburnus Maior Au-Ag Mines, Roman Dacia (Rșia Montana, NW Romania)" (B. Cauuet, B. Ancel, C. Tamas, M. Boussicault, C. Orcel), "The "chessboard" classification scheme of mineral deposits: Its use in archeometallurgy" (H. G. Dill), "Alda Tepe (Krumovgrad, Bulgaria): Late Bronze Age and early Iron Age Gold Mining in the Eastern Rhodopes - Preliminary Reports" (A. Jockenhövel), "The "Barrens" (South France). A copper and silver mine of the late Republic (IInd-Ist c. BC). About the archaeological researches 2009-2010" (Argitxu Beyrie, Jean-Marc Fabre, Éric Kammenthaler, Julien Manteau, Gabriel Munteanu, Christian Rico), "Extraction of copper in Sweden during the Bronze Age? Possibility, myth or reality?" (J. Ling, E. Hjärthner-Holdar, L. Grandin), "Medieval Mining areas in Sweden" (I.-M. Pettersson Jensen), "Experimental Archaeometallurgy" (B. Ottaway), "The Nepal-Process - Ethnoarchaeology meets Experimental Archaeometallurgy" (N. Anfinset, Gert Goldenberg, Elena Silvestri), and "Smelting of Sulfidic Ore During the Bronze Age in the Eastern Alpine Region: An Experimental Approach" (E. Hanning).

Papers present on Friday, July 1st, consisted of "Metallurgical Studies and Manufacturing of the Sanzeno karnykes (Trentino, Italy)" (P. Piccardo, B. Mille, A. Ervas, E. Silvestri, P. Bellintani, R. Melini, R. Roncador), "A Bar Ingot Hoard from Kingsway, London" (J. Bayley, J. Cotton, T. Rehren, E. Pernicka), "Roman metalworking in Northern Italy between archaeology and archaeometry: two case studies" (E. M. Grassi), "The Stanley Grange Medieval Iron Project" (P. de Rijk), "Ironmetallurgy of The Pannonian Avars of the 7-9th Century Based on Excavations and Material Examinations" (B. Török, Z. Gallina, Á. Kovács), "The Dieulouard clamps : a case of geochemical compatibility questioning for the Lorraine early-medieval iron production activities" (A. Disser, Ph. Dillmann, M. Leroy, P. Merluzzo), "Iron production and modernization in Sweden 1150–1350" (B. Berglund), "A 13th Century Blast Furnace near Langenbruck (BL, Switzerland)" (J. Tauber), "The sixteenth century blast furnace and finery forge of Glinet at Compainville (Normandy, France): archaeological study" (D. Arribet-Deroin), "The Anglo-Saxon cemetery at Dover Buckland, Kent, UK: a metallographic examination of some iron artefacts" (J. Lang), "Rewriting the story of tin in Early Bronze Age Britain and Ireland: Science, theory and moving beyond biography" (P. Bray), "Iron Age Crucibles and Bronzeworking at Eberdingen Hochdorf" (D. Modarressi-Tehrani, J. Biel), "The Roman Brass-Melting Crucibles of Autun/France: A Petrological and Geochemical Approach" (D. König, V. Serneels), "Archaeometrical investigations of the post-reduction process: synthesis of recent interpretation in France, for the Iron Age" (S. Bauvais, M. Berranger, P. Fluzin), "Byzantine small finds and their workshops in Ephesus – with particular reference to technological studies on Byzantine metalwork" (B. Bühler, A. M. Pülz, F. Kat), "The Alsatian Altenberg : a seven centuries laboratory for silver metallurgy" (P. Fluck, J. Gauthier, A. Disser), "A new step towards a better understanding of smithing slags: the complementarity of ethnoarchaeology and petrological techniques" (R. Soulignac, V. Serneels), "Developing a methodology for metallurgical remains from

intensive surface surveys: the Kythera Island Project case study" (M. Georgakopoulou), "Ancient mines in Cyprus : The contribution of charcoal analysis to the study of the ancient copper industry" (M. A. Socratous, V. Kassianidou, G. Di Paquale), "Distinguishing iron production sites by chemical signature of bloomery slag in Southeastern Norway - The iron clench nails in the Gokstad ship – only local production or of various origin?" (J. H. Larsen, B. Rundberget, J. Bill, L. Grandin), "Mineralogical-Petrological investigations of metallurgical slags from the Late Bronze Age copper-smelting site Mauken (Tyrol, Austria)" (M. Krismser, G. Goldenberg, P. Tropper), "Archaeometric Investigations on Late Bronze Age Slags from Copper Smelting Sites in Trentino (Northern Italy)" (A. Addis, I. Angelini, I. Giunti, E. Silvestri, G. Artioli), "The identification and characterization of pre-Bessemer iron and steel, applying the slag-analytical method" (V. F. Buchwald), "Some Comments on Perceptions in Archaeometallurgy" (T. Kienlin, A. Hauptmann), "COLORANDO AURO: Laboratory experiments and examination of a medieval practise to modify gilded silver surfaces" (A. Crabbé, G. Dewanckel, I. Vandendael, M.-A. Languille, H. Terryn, H. J. M. Wouters), "Copper-silver alloy minting from modern time : non-destructive distinction of ancient processes" (I. Guillot, F. Téreygeol, A.-L. Helbert, D. Solas), "Bismuth behaviour during ancient processes of silver-lead production" (M. L'Héritier, S. Baron, L. Cassayre, F. Téreygeol), "Co-Smelting, the Beginning of Fahllore Metallurgy - Evidence from the Inn Valley (Austria) and from Smelting Experiments" (K.-P. Martinek), "High lead in copper alloys: why does it help casting?" (B. Mille, P. Piccardo, R. Amendola, A. Adobati), "New horizons: archaeometallurgy in eastern Europe and beyond" (R. Krause), "The First Industrial Revolution?: Reconsidering transitional Bronze Age/early Iron Age metal production in Georgia. Interim results of the September/October 2010 field survey in Guria" (B. Gilmour, N. Khakhutaishvili), "Chemical, lead isotope and metallographic analysis of extraordinary arsenic-rich alloys used for jewellery in Bronze Age Armenia" (K. Meliksetian, R. Schwab, S. Kraus, E. Pernicka, M. Brauns), "The South Caucasus Archaeometallurgy Project: Investigation of Early Mining and Metal Production on the Armenian Plateau. An Interim Report" (D. Peterson, A. Gevorkyan, K. Meliksetian, A. Bobokhyan, J. Dudgeon, M. Tromp, S. Hovakimyan, A. Vardanyan, C. Meredith, T. Schneyder), "The Scandinavian traditions in the blacksmith craft of Northern Rus" (N.N. Terekhova, V.I. Zavyalov), "Late Bronze Age axe traffic from Volga-Kama to Scandinavia? The riddle of the KAM axes revisited" (L. Melheim), "Bronze Age Tin Mines in Central Asia" (J. Garner), and "Gold in Georgia - Preliminary Results" (I. Gambaschidze, A. Hauptmann, Th. Stöllner).

Posters were presented on all three days of the conference and were organized into eight thematic groups. The groups and posters included *Group 1, Metallurgical Innovation Stages of Early Metallurgy in Europe* with "The first metallurgy in North-Eastern Iberia. Origin, use and social implications" (I. Soriano), "Bell Beaker Metallurgy in Central Spain: Technology, Natural Alloys and Provenance" (C. Blasco, A. Climent-Font, I. Montero-Ruiz, R. Flores, M. Murillo-Barroso, P. Rios, S. Rovira, A. Zucchiatti), "The Vinča culture mining

complex in Jarmovac, southwest Serbia” (S. Derikonjić, M. Radivojević, E. Pernicka, Th. Rehren), and from *Group 2, Regional Studies*, included “Ancient metals provenancing in the Eastern Alps: a chemical and isotopic database” (I. Giunti, P. Nimis, I. Angelini, G. Artioli, I. M. Villa), “Metallographic investigation on copper nails of the Roman age” (C. Mapelli, S. Barella, A. Gruttadauria, D. Mombelli, C. Baldizzone), “Copper production around AD1300 in Meråker, Norway” (A. Espelund), “The Bronzi del Garda Project (Verona – Italy)” (P. Salzani, E. Pernicka), “Investigation of bronze votive offerings from the Early Iron Age sanctuary of Ancient Pherae, mainland Greece” (S. Orfanou), “Solveira Hoard (Northern Portugal): a multidisciplinary approach” (C. E. Bottaini, C. Giardino, G. Paternoster), “Going in Circles: The use of lead metal through time in Magnesia” (E. Asderaki-Tzoumerkioti, Th. Rehren), “Lead ingots, lead isotopes and the history of Roman lead trade – the Corpus Massarum Plumbearum Romanarum (CMPR) – running results” (M. Bode, N. Hanel, A. Hauptmann, P. Rothenhöfer), “The Republican Shipwreck of Mal di Ventre (Sardinia) and its Lead Ingots” (N. Hanel), “A Roman silver ore washing plant in Carthago Nova. The excavations of Cabezo del Pino (La Unión-Portmán, Murcia, Spain), 2008-2010” (J. A. Antolinos Marín, J.-M. Fabre, C. Rico), “Mines, mints, forced currency and invalidated coins in the middle Rhinelands. A challenge to archaeometrical investigations of mediaeval silver coins” (S. Kötz, N. Lockhoff, S. Lorenz, G. Markl, E. Pernicka), “Trace-element and lead-isotope fingerprinting of silver from the medieval mine at Melle (France)” (G. Sarah, F. Téreygeol, M. Bompaigne, B. Gratuze), “From wood and bones: a methodological approach to set apart the materials used for silver refining” (M.-P. Guirado, F. Téreygeol, P. Dillmann), “Circulation of Iron Products in the Iron-Age of Eastern France and Southern Germany: Multidisciplinary and Methodological Approaches Towards the Provenance of Ancient Iron A DFG-ANR-Project” (S. Bauvais, R. Schwab, M. Brauns, P. Dillmann), “Archaeometallurgical studies on iron production from the site of Priniatikos Pyrgos, Mirabello Gulf, Northeastern Crete” (E. Filippaki, Y. Bassiakos, B. Hayden), “Iron slags from the Late Iron Age/Early Roman site of Pintia (Las Quintanas, Padilla de Duero, Valladolid, Spain)” (M. Gener, S. Rovira, C. Sanz, F. Romero), “Excavation and preliminary archaeometric investigations of iron smithing slags from the Roman workshops at Montebelluna (Treviso, Italy)” (I. Angelini, M. S. Busana, D. Francisci, L. Bernardi, A. Bacchin, G. Molin), “The metallography of two Roman swords from Mušov, Czech Republic” (J. Hošek, V. Beran, B. Komoróczy), “Primary pieces of iron metal in the Roman port of Narbonne (Aude, France): export, importation, transformation” (G. Pagès, Ph. Dillmann, C. Sanchez), “The Sunken Smelter in Ireland - Grange 2, Co. Meath” (A. Wallace, L. Anguilano), “Evidence of Small-Scale Iron Smelting in Early Islamic SW Portugal? Preliminary Results of the Excavation of the Chamíné Workshop (São Luís, Odemira)” (M. Grangé), “Iron production founding the country” (L. Bentell), “From the Bloomery Furnace to the Building Yard. Iron Supply for the Construction of the Cathedral of Bourges” (M. L’Héritier, C. Dunikowski, J.-M. Bordeloup, B. Gratuze, Ph. Dillmann), and “The Furnace ‘Canecchio’ of Forno Volasco” (W. Nicodemi, C. Mapelli, S. Barella, A. Gruttadauria, M. Bonini, C. Da Prato).

Posters presented in *Group 3, Early Mining in Europe and the Distribution of Raw Sources*, included “Archaeometallurgical Investigations in Gold Mining Districts of Armenia” (R. Kunze, D. Wolf, A. Bobokyan, Kh. Meliksetian, E. Pernicka), “Roman non-ferrous and noble metal mining in Kosovo” (G. Gassmann, G. Körlin), “Prehistoric Copper Mining in Derektugun, Anatolia” (Ü. Yalçın, S. Acar, B. Findik, C. Groer, Ö. İpek, G. Körlin, A. Maass, C. Schoch), “New Evidence for Roman Mining in Britain” (S. Timberlake), “Pre-Roman Mining and Metallurgy in Ibiza” (M. Hermann, M. Prange, Ü. Yalçin), and “If you look for a mine, look near an ancient smelter - Archeometallurgical studies and economic geology at the western edge of the Bohemian Massif, SE Germany” (H. G. Dill), while posters in *Group 4, Experimental Archaeometallurgy*, posters included “Minters strike again: an in-depth study of the French medieval minting techniques from an historical, archaeometric and experimental point of view” (A. Arles, F. Téreygeol, B. Gratuze), “An experimental approach to the copper axes with central shaft-hole from South-Eastern Europe” (J. Heeb), “Shaping the bronze: An experimental reproduction of prehistoric copper alloy working techniques” (N. Nerantzis), and “Studies of medieval iron consumption by experimental Metallurgy and Archaeology” (C. Karlsson).

Posters presented in *Group 5, Reconstruction Ancient Technologies*, consisted of “New excavations in smelting sites in Trentino, Italy: archaeological and archaeobotanical data” (E. Silvestri, P. Bellintani, F. Nicolis, M. Bassetti, S. Biagioni, N. Cappellozza, N. Degasperi, M. Marchesini, N. Martinelli, S. Marvelli, O. Pignatelli), “Archaeometallurgical studies on slags of the Middle Bronze Age Copper Smelting Site S1, Styria, Austria” (S. Kraus, S. Klemm, E. Pernicka), “Roman alloying traditions and the use of copper alloys in Denmark” (A. Jouttijärvi), “New Insights into the Manufacturing Process and Decoration Technique of the Axe from Thun-Renzenbühl” (D. Berger, K. Hunger, S. Bolliger-Schreyer, D. Grolimund, S. Hartmann, J. Hovind, F. Müller, E. H. Lehmann, P. Vontobel, M. Wörle), “A technological study of 50 protohistoric bronze discs with concentric decoration from the Fucino area, in Abruzzo” (M. L. Mascelloni, C. Giardino), “Comparison of compositional variations in modern European bronze coins with variations in some ancient bronze and gold coins” (S. Shilstein, S. Shalev), “New tools for old metallurgical processes: mouth blowpipes in 4th century BC Iberia” (A. Perea, B. Armbruster), “The technology and materials of the gothic goldsmith” (O. Mecking), “Life and work at a medieval blast furnace site” (G. Magnusson), “S-shaped temple rings from Vrbno, characterization of manufacturing processes” (E. Ottenwelter, J. Hošek, J. Déd), “Contact tinning: a laboratory investigation of an old plating technique” (J.-M. Welter), and “Analysis of firing conditions of ancient ceramics and refractories” (R. Telle, M. Thönissen), while posters in *Group 6, New Horizons: Archaeometallurgy in Eastern Europe and Beyond*, comprised “Ancient Furnace Discovered On The South Caucasus - (New Excavations)” (A. Hasanova), “The Composition of Early Iron Age Copper-Alloy Metalwork from Aral region” (S. A. Ruzanova), and “The mirrors of the early nomads of South Ural: a complex archaeotechnological study” (I. Ravich, M. Treister).

Poster presented in *Group 7, New Approaches, New Technologies in Archaeometallurgy*, included “Osmium Inclusions in Ancient Gold Products from South Urals burial mounds” (V. Zaykov, E. V. Zaykova), “The use of copper isotopes for characterisation of Cypriot copper ores and oxhide ingots” (F. Hasendonckx, Ph. Muchez, P. Degryse, I. Angelini, G. Artioli, F. Vanhaecke), “Provenance implications from trace element, Pb- and Cu-isotope signatures of Early Bronze Age hoards from Sachsen-Anhalt, Germany” (M. Frotzscher, N. Lockhoff, G. Borg, E. Pernicka, R. Mathur), “High energy X-Ray tomography of Bronze Age copper ingots” (G. Artioli), “Workshops in Mecklenburg - can new metal analyses prove the presence of local production centers?” (H. W. Nørgaard), “Embrittlement of European and Near Eastern Silver” (R. Wanhill), “Predating of the Mining in the Harz Mountains to the Bronze Ages and the Silver Circulation in Germany in the Medieval Times” (R. Lehmann, C. Vogt), “Geochemical fingerprint of iron ores from Elba Island: a new potential tool for iron archaeometallurgy in the Mediterranean region” (M. Benvenuti, A. Dini, M. D’Orazio, A. Corretti, L. Chiarantini, P. Costagliola), “Using pollen and geochemistry in lake sediment to trace early mining activities and settlements, a study of the Gladhammar area in south-east Sweden” (J. Karlsson), “Multidisciplinary Analytical Approach And First Development Of Multivariate Analyses: Depiction Of The Medieval Iron Market In Ariège (France)” (S. Leroy, Ph. Dillmann, S. Cohen, L. Bertrand, F. Téreygeol, C. Verna), “Characterization of Ancient Japanese Sword Hand Guards through Time of Flight Neutron Diffraction and X-Ray Fluorescence” (F. Grazi, F. Civita, E. Barzagli, A. Agostino, A. Benzonelli, A. Scherillo, M. Zoppi), and “Ra-226 Dating and Authenticity of Ancient Metals” (I. M. C. Liritzis, N. Zacharias), while posters in *Group 8, Archaeometallurgy in Non-European Countries*, included “Provenance of ancient metallurgical artifacts: Implications of new Pb isotope data from Timna ores” (I. Segal, M. Bar-Matthews, A. Matthews, Y. Harlavan, D. Asael), “Levantine Middle Bronze Age Metallurgy: A case study of the socketed spearheads” (Z. El Morr, F. Cattin, Y. Lefrais, M. Pernot), “Microstructural and Chemical Interpretation of Bronze Artefacts from Sangtarashan Iron Age Site, Luristan, Western Iran” (O. Oudbaschi, S. M. Emami, P. Davami), “New Investigations on the Early Bronze Age Royal Tombs of Alacahöyük, Turkey” (Ü. Yalçın, L. Özen, A. Zararsız), and “Interdisciplinary Research in Prehistoric Mining and Metallurgy in Northern Chile (Atacama Desert)” (D. Salazar, V. Figueroa, B. Mille, G. Manríquez, H. Salinas, J. L. Guendon, D. Morata, H. Carrion, A. Cifuentes, J. Berenguer, Y. P. Corrales).

Web Resources

The *Association for the Protection of Afghan Archaeology* (APAA) has a link on their website to information about the ancient copper mine at Mess Aynak, Afghanistan. At this link is an open-access ebook about the mine, edited by Prof. Zmaryalai Tarzi, which is being threatened for destruction by development of the copper deposits by a Chinese mining company. The AAPA have started an online petition drive to gain signatures in support of saving at least some of the archaeological components at Mess Aynak, which include

much more than just the copper mine. The ebook, online petition, and more information about Mess Aynak can be found at the AAPA website link: <http://www.apaa.info/index.html>

BIOARCHAEOLOGY

Gordon F.M. Rakita, Associate Editor

Bias & Science: the Gould-Morton Controversy

The bioanthropological blogosphere (Hawks 2011; Horgan 2011; Killgrove 2011; and Meyers 2011) was alive in June with discussions of a published re-analysis of Stephen Jay Gould’s classic dissection of early American physician and craniometrist Samuel George Morton (Lewis et al. 2011). Even the *Gray Lady* got into the act with an article in its June 13th edition (Wade 2011) and an editorial in its pages. What was the controversy about and why is this important to readers of the SAS Bulletin? At issue were the craniometric studies Morton conducted in the early 1800s (Morton 1839). Morton examined a large (if problematic) sample of human skulls from around the world in an effort to test his ideas regarding whether humans were one species or many. As pointed out by Lewis and colleagues (2011), Morton’s collection of empirical data and testing of his ideas (nascent hypotheses?) was “groundbreaking.”

In his 1981, highly lauded (and rightfully so) book *The Mismeasure of Man*, Stephen Jay Gould uses Morton’s *Crania Americana* as an example of a scientist’s (racist) bias influencing his research. While Gould does not recollect Morton’s data, he does re-analyze it and concludes that Morton consciously or unconsciously succumbed to three flaws. Specifically, he claimed that Morton (1) selectively reported data, (2) manipulated the make-up of his sample groups, and (3) mis-measured skulls in ways that supported his intellectual bias.

The authors of this new re-analysis of Morton’s work (Lewis et al. 2011: 2) correctly note that Gould’s re-examination of Morton’s work “is widely read, frequently cited, and still commonly assigned in university courses.” This is all true. Indeed, I read Gould’s critique of Morton as an undergraduate and have lectured about his argument in my own courses. Yet, Lewis and his colleagues cogently and successfully refute each of Gould’s indictments of Morton’s work. They do so through a careful recollection of craniometric data from 308 of Morton’s original 670 skulls (46%). They conclude (2011: 5-6) that their “.results falsify Gould’s hypothesis that Morton manipulated his data to conform with his a priori views.”

Morton may indeed have been a racist, though the jury is out on that assertion. Certainly Horgan (2011) is correct when he writes that “Defenders of slavery embraced Morton’s work.” If only all scientists were able to safeguard their work from being misused by others. However Cook (2006: 36) notes that the “.literature on scientific racism has largely ignored Morton’s scientific contributions, but physical anthropologists claim him

as an intellectual ancestor.” Indeed, in Cook’s chapter published five years prior to Lewis and colleagues’ new study, Cook takes Gould to task for his misleading characterization of Morton as a racist and a “cheat.” Cook rightly “contextualizes” both Morton’s flaws and his contributions (e.g. his argument debunking the idea that Native Americans were not related to the ancient Moundbuilders of North America). Obviously, as Lewis and colleagues and many of the authors in the blogosphere have pointed out, crania size is influenced by environment and geography as well as overall stature and sex. Moreover, as I hasten to point out to my students, normal variation in human cranial or brain size surely has limited, if any, correlation with cognitive capacity (however that might be measured). Racism has no place in modern bioarchaeology or biological anthropology (Edgar and Hunley 2009).

Regardless of your view of either Morton or Gould, or Lewis et al. for that matter, the points I would like to make are that (1) the value of scientists’ efforts lies not in their unbiased work but in their collection of reproducible data and that (2) re-examination of skeletal collections (or for that matter any previously studied material or dataset) is vitally important to scientific disciplines. To begin with the first, as I have pointed out in this column before, one important hallmark of science is the collection of data that can be reproduced by other researchers. This enables others to verify the original work of scientists. It is this, and not some supposed unbiased attitude that makes science a powerful way to make sense of the world. Gould was right in noting that scientists are products of, and indeed constrained by, their contexts and their biases. Indeed, as Martinson et al. (2005) have demonstrated, scientists frequently engage in all manner of misbehavior and succumb to their predispositions and predilections. But when the work of a scientist can be examined and their data recollected (or checked in some fashion), then we can uncover poor and erroneous conclusions. This is precisely what happened with both Morton and Gould.

And this leads to my second point, namely that human skeletal collections and their continued restudy (Buikstra and Gordon 1981; Roberts and Mays 2010) are fundamental to the ongoing work of bioarchaeological science. Ubelaker (2006: 73-75) noted that Hrdlička, surely the father of American Physical Anthropology if ever there was one, credited Morton’s efforts to build up skeletal collections for comparative purposes as the impetus for his own. We are fortunate to have at our disposal numerous large skeletal collections including the Robert J. Terry Anatomical Skeletal Collection (at the National Museum of Natural History - Smithsonian), the Hamann-Todd Human Osteological Collection (at the Cleveland Museum of Natural History), the Spitalfields Collection (at the Natural History Museum of London), the W. Montague Cobb Collection (at Howard University), and Morton Collection (at the University of Pennsylvania Museum of Archaeology and Anthropology; although see Buikstra [2006: 12] regarding the value of Morton’s collection for contemporary research). Add to these hundreds of other smaller, though by no means less valuable, collections that we can study and restudy. These collections (and their associated collection contexts and meta-data) have been used to establish and test many of our methodologies and

standards and serve as resources that we can return to with new questions, techniques, and methods in order to augment and improve our understanding of human biology and adaptation through time. As both Gould and Lewis et al. have demonstrated, they also provide us with the opportunity to re-assess prior conclusions and catch our errors. That is the hallmark of good science.

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REMOTE SENSING AND GIS

Apostolos Sarris, Associate Editor

Announcements for Conferences and Workshops

ISPRS Working Group V/2 Conference on Cultural Heritage Data Acquisition and Processing, The Kings Manor, York, United Kingdom, August 17-19, 2011.

The Commission V (Close Range Sensing: Analysis and Applications) of the Working Group V/2 (Cultural Heritage Data Acquisitions and Processing, 2008-2012) of ISPRS (International Society for Photogrammetry and Remote Sensing) is organizing a conference on Cultural Heritage Data Acquisitions and Processing. The topics of the conference include: Development of sensors & hardware for image & point-based survey, Static & mobile mapping solutions suitable for cultural heritage application, Aerial & low-level imaging approaches using UAV's, UAS's and KAP, Visible, multi & hyper-spectral image acquisition & processing, Data processing approaches including low-cost & open-source software, Three-dimensional analysis & presentation of cultural heritage survey data, Multi-light imaging techniques, Development of techniques & standards for cultural heritage survey and Best practice application of developing survey technologies within archaeology, architecture, conservation & cultural heritage projects.

At the same time, the XXII Congress of the ISPRS has been announced for the period of August 25-September 1, 2012 at Melbourne, Australia: www.commission5.isprs.org/wg2/

Finally, the latest Newsletter of the Archaeologic Interest Group of the Remote Sensing and Photogrammetric Society (Autumn 2010) can be accessed at www.commission5.isprs.org/wg2/

Prospection Methods to Archaeology in Germany, University of Mainz, Germany, September 9-10, 2011.

The conference, which is being organised with the support of the ISAP and AARG, will take place at the University of Mainz on 9 and 10 September 2011 and it will address topics on air-photography, geophysical prospection surveys and other survey methods. The focus will be on the application and integration of prospection into German archaeological practice. For more information: www.geowiss.uni-mainz.de/351_DEU_HTML.php

9th International Conference on Archaeological Prospection, Izmir, Turkey, September 19-24, 2011

The 9th International Conference on Archaeological Prospection will be organized by the Center for Near Surface Geophysics and Archaeological Prospection (CNSGAP) of Dokuz Eylül University and International Society for Archaeological Prospection (ISAP). Its sessions will include topics on Archaeological prospection in the past, present and future in Anatolia, Site based studies, Integrated prospection methods, Processing, interpretation and visualization, Technical aspects and archaeological feedback, Remote sensing, GIS, imaging, Archaeological prospection in urban sites, Archaeological prospection in restoration and conservation studies and Marine studies. For more information: web.deu.edu.tr/ap2011/

Joint Meeting of AARG & EARSeL: Ambitions and Realities: Remote Sensing for Archaeology, Research and Conservation, Poznan, Poland, September, 21-24, 2011.

The joint meeting of the Aerial Archaeology Research Group (AARG) and European Association of Remote Sensing Laboratories (EARSeL) aims to deal with the exploration of objectives and challenges in the effective use of remote sensing techniques in archaeological and landscape studies, not only for research but also for the promotion of conservation and public understanding. How can our various techniques be deployed in combination with one another, and with what practical outcomes? How can we build bridges across regional or national divides? What can we learn from combining or comparing our techniques? How can we make our results useful to those involved in practical conservation and future planning? How do our national or regional realities assist or impede the use of remote sensing techniques in research, conservation and the promotion of public understanding? For more information: archo.amu.edu.pl/aarg-earsel/index.htm

ELMF 2011: European Lidar Mapping forum, Salzburg, Austria, November 29-30, 2011.

The ELMF is the premier event in Europe focused on applying the technology of LIDAR and laser scanning to deliver outside mapping and imaging solutions in a timely and cost-effective manner. The ELMF conference is a unique platform on which to launch the latest concepts from commercial or academic research, leading edge innovations in technologies, improved operating practices, reports on actual project experiences and to discuss new applications and markets being driven by the rapid improvements in LIDAR technology. The conference will focus on the use of LIDAR to support transport, urban modelling, coastal zone mapping, asset management and GIS applications. The deadline for submitting an abstract is 25th of July, 2011. For more information: www.lidarmap.org/ELMF/conference/conference_programme.aspx

1st International Conference on Virtual Archaeology, Saint Petersburg, Russian Federation, June 4-6, 2012.

The First International Conference on Virtual Archaeology will be organized by the Department of the Eastern Europe and Siberian Archaeology of the State Hermitage Museum in Saint-Petersburg (Russian Federation). The conference aims to address topics related to the theoretical aspects of Virtual Archaeology, up-to-day computer technologies for the archaeological prospecting, data processing, modeling, archaeological reconstructions and visualizations. The extended abstracts with illustrations in two languages (Russian & English) will be issued in a special volume of scientific works publishing at the State Hermitage Museum. For more information contact Dr.Daria Yu. Hookk by email: hookk@hermitage.ru

Announcement of Projects

ARCHAEO LANDSCAPES EUROPE: Five years of pan-European collaboration to foster education and research in aerial archaeology and other advanced surveying techniques

Aerial archaeology, satellite imagery, geophysical investigations and airborne laser scanning (LiDAR) are techniques of archaeological surveying that have long been recognised throughout Europe and abroad. But still the use of these methods is not mandatory in all European countries. While in some parts of Europe aerial archaeology is hardly used at all, LiDAR scanning is not known in others – and vice versa. Sometimes this is caused simply by the lack of expert knowledge within some countries; sometimes it is the lack of awareness of the abilities of these techniques; and sometimes it is simply the differing cultural heritage policies in different countries that hinder their adoption.

To overcome these problems, the mutual exchange of ideas, teaching activities and networking in general has to be cultivated amongst universities, cultural heritage management authorities and research institutions from all over Europe.

In February 2010 the European Commission (Directorate General Education and Culture) accepted the project proposal for the 5-year networking project within the framework of the funding programme Culture 2007–2013 (Agreement number - 2010 - 1486 / 001 – 001, CU7-MULT7). Currently 39 partners from 25 European countries are working together to build up a self-supporting network of institutions and partners involved in advanced surveying techniques such as aerial archaeology, satellite imagery, geophysics and airborne laser scanning. A budget of 5 million Euros (50% provided by the EU, 50% coming from the co-organising partners) will support the work for the next five years.

The partner organisations are drawn from the field of archaeological heritage management, from universities, archaeological research institutions and from pan-European non-profit organisations such as the Aerial Archaeology Research Group (AARG), which was one of the leading partners in the predecessor project *European landscapes: past, present and future* (2004–2007) and was also deeply involved in the proposal for the *ArchaeoLandscapes Europe* project.

Public awareness and dissemination of challenging skills in aerial and remote sensing techniques will be achieved by the project through eight following key Actions:

1. By creating an ultimately self-supporting network, with a small central secretariat, to provide leadership, coordination and advice on the use for heritage purposes of aerial photography, remote sensing and landscape studies.
2. By using traditional and innovative methods to publicize the value of aerial survey, remote sensing and landscape studies amongst the general public, students, teachers and all those who explore, enjoy or care for cultural landscapes and heritage sites across Europe.
3. By promoting the pan-European exchange of people, skills and understanding through meetings, workshops, exchange visits, placements and opportunities for specialist training and employment.
4. By enhancing the teaching of remote sensing and landscape studies through courses for students and teachers, and in the longer term through a European masters degree in remote sensing and heritage management.
5. By securing better exploitation of existing air-photo archives across Europe by researching, assessing and publicizing their potential for heritage interpretation and landscape conservation.
6. By providing support for aerial survey, remote sensing and landscape exploration in countries relatively new to their use, especially in northern, eastern and southern Europe.
7. By further exploring the uses of laser, satellite and other forms of remote sensing and web-based geographical systems in archaeological and landscape research, conservation and public education.
8. By providing technical guidance and advice on best practice

in aerial survey, remote sensing and landscape studies, with a particular emphasis on conservation and heritage management.

A large number of meetings, conferences, aerial field schools, technical training schools, exhibitions and publications will be the basis of the project's work, both for the internal and external networking aspect and for the dissemination of ideas and knowledge to the archaeological community and to the general public.

For more information on the 'ArchaeoLandscapes Europe' project, please visit www.archaeolandscapes.eu.

Mobility Bursaries/Grants for Scholars and Experienced Students

ACE - Archaeology in Contemporary Europe programme (ace-archaeology.eu/) announced grants for scholars and experienced students that will be distributed by 4 institutions which collaborate within the framework of the EU funded project "ACE - Archaeology in Contemporary Europe":

1. **ADS Archaeology Data Service** (York): Through the Archaeology in Contemporary Europe project the ADS is able to offer a limited number of work-based placements in archaeological digital data archiving and documentation. The aim of the placements is to provide an introduction to the work of the ADS on the preservation and dissemination of digital data, and to contribute to the development of shared European standards for good practice. archaeologydataservice.ac.uk/

2. **INRAP Institut national de recherches archéologiques préventives** (Frankreich): In the framework of the Archaeology in Contemporary Europe (ACE) project, Inrap is able to offer a limited number of work-based placements in preventive archaeology. The aim of the placements is to provide an overview of preventive archaeology in France. Placement holders will be in contact with our teams on field operations: evaluations, excavations – including mechanised archaeology techniques - and post-excavation analysis. <http://inrap.fr/>

3. **Unité d'archéologie de la ville de Saint-Denis** (France): In the framework of the Archaeology in Contemporary Europe (ACE) project, the Unité d'archéologie de la ville de Saint-Denis (France) aims to offer placements that will deal with the Observation and participation in the activities of a municipal department of archeology through the excavation of "l'îlot Cygne", Discovering the City of Saint-Denis and its archaeological department, its mission, its organization, its actions, its partners, Discovery of an urban excavation through its scientific objectives, its educational goals and objectives of cultural mediation and Discovery of an unusual public outreach structure (scaffold for public), the "Making of the City" centered around "Reading the City" and building archaeology. [http:// culture.gouv.fr/fr/arcnat/saint-denis/en/](http://culture.gouv.fr/fr/arcnat/saint-denis/en/)

4. **Roman-Germanic Commission of the German Archaeological Institute** (Germany): Through ACE, the RGC

organizes an International Summer School (5-24 September 2011) at Manching, Pfaffenhofen, Bavaria (Germany) for students of later European Prehistory, covering aspects of Celtic culture, archaeology and heritage management. Participants will take experience in advanced methods of excavation and documentation, field survey techniques, and geomagnetic prospection.

For more information contact Holger Wendling (wendling@rgk.dainst.de)

ISAP NEWS

The latest issues of the *Newsletter of the International Society for Archaeological Prospection* included the following articles:

Issue 27 - May 2011: Editor's Note by Robert Fry; Remote Sensing for Archaeology: an AARG-EAC-ISAP working party by Dave Cowley and Chris Gaffney; Iberian-Roman City of Puig Ciutat: First Season of surveys and excavation by Robert Tamba; Integrating multi-scalar remote sensed data: a comment on resolution, calibration and validation by Tara-Jane Sutcliffe; The DART Project: Developing the roadmap for archaeological remote sensing in the 21st century by Robert Fry and Anthony Beck;

Issue 26 - February 2011: Editor's Note by Robert Fry; A Happy New Year from the IFA GeoSIG by Jimmy Adcock & Peter Barker (GeoSIG Committee); Surveying Prehistoric Scandinavian Boathouses and Graves: An example from Central Norway by Arne Anderson Stamnes; The role of Archaeological Prospection in the Portus Project (Italy) by Stephen Kay et. al; NSGG Day Meeting on Recent Work in Archaeological Geophysics 2010 by Paul Linford Review of the 9th Biennial NSGG Conference by Chrys Harris & Michael Puntorno The new Ludwig Boltzmann Institute for Archaeological Prospection and Virtual Archaeology by Immo Trinks.

The newsletter also includes news on Conferences, Seminar and Course Announcements and Journal Notifications.

BOOK REVIEWS

David Hill, Associate Editor

Three important volumes are reviewed in this issue. The first "Scientific Methods and Cultural Heritage" reviewed by SAS President-Elect Rob Tykot describes a volume that if it hasn't already found a place on your bookshelf or institution's library should in the near future. This is the book that I can assign readings from to undergraduates who may not have strong backgrounds in the physical sciences and expect them to understand the text.

The second volumes "Glass along the Silk Road: from 200 BC to AD 1000" goes well beyond its title by providing a series of

conference papers covering descriptions and analyses of archaeological glasses from western Europe to eastern Asia. If you have the least interest in glass this volume is for you.

The third volume, "Visualizing the Sacred: Cosmic Visions, Regionalism, and the Art of the Mississippian World" focuses on new interpretations of the iconography belonging to the Southeastern Ceremonial Complex (SECC). Defined in 1945 by Antonio Waring and Preston Holder the Southeastern Ceremonial Complex encompasses images in the arts and the construction of mounds as part of a regional cult that extended over much of southeastern and central United States beginning around 900 C.E. Several of the papers present theoretical and methodological ideas that might be applicable to archaeological remains from elsewhere.

One of the important functions of the SAS Bulletin is to not only to inform our members of upcoming events and publications that may be of relevant to their research interests but also to educate us regarding new developments in archaeological sciences regardless of their context. While, I am still soliciting volumes for review, I am also interested in obtaining proceedings of regional or topically-focused conferences. The proceedings of such conferences are not always much distributed beyond the attendees. Please submit these conference proceedings as PDF's or other common format on a CD or DVD. Also, recommendations for potential reviewers would also be appreciated at the time of submission.

Scientific Methods and Cultural Heritage: An introduction to the application of materials science to archaeometry and conservation science. Gilberto Artioli. Oxford University Press, New York: 2010. xv + 536 pp. Price US\$117 (cloth). ISBN 978-0-19-954826-2.

Reviewed by Robert H. Tykot, Department of Anthropology, University of South Florida, 4202 E. Fowler Avenue, Tampa, FL 33620-8100 USA.

As noted by the author, the purpose of this textbook is to be an introduction to materials science for non-science majors interested in cultural heritage. As a professor of geosciences at the Università degli Studi di Padova (Italy), Gilberto Artioli has plenty of experience teaching analytical methods to students and archaeologists with little scientific background, a situation well understood by SAS members. Only in the last decade or so have there been many books to choose from, beyond that of Michael Tite's *Methods of Physical Examination in Archaeology* (1972). Today, there are nearly a dozen such broad publications, with variations based on the intended audience, the depth of detail for the analytical methods vs. examples of applications and specific studies, and the cost, which is a big issue for using as a textbook rather than as a library reference. Artioli is quite clear about his intent to integrate scientific techniques with the views of archaeologists, artists, curators, conservators, and scientists, and to further develop interdisciplinary relationships. Thirteen other scholars have contributed to the content of this volume, mainly in the case studies.

Following an introductory chapter dealing with these issues, the book is organized in two major parts: "Analytical Techniques" (183 pp.), and "Materials and Case Studies" (234 pp.). The overview of analytical techniques includes a major section on each technique category (spectroscopy, mineralogy/petrology, imaging, remote sensing and virtual reality), with several pages of detail on the scientific principles followed by a box for each specific type (e.g. X-ray fluorescence spectroscopy, neutron diffraction, reflectometry). Keywords are in bold and the fundamentals are more than sufficiently covered in the text and accompanying figures and tables. Limitations of the methods applied to archaeological materials are also well covered, from being destructive or only surface analysis, to sensitivity and precision, to alteration of materials due to contamination, weathering, reprecipitation, etc. The increasing popularity of portable techniques such as XRF and Raman spectroscopy is mentioned, along with their limitations. While there is a 4-page box about portable XRD/XRF and how its non-invasive use has made it very important for conservation science and art museums, it does not specifically address its differences with a regular XRF spectrometer.

Quite important are the sections addressing detection limits and limiting questions, and matching the research questions with specific materials and methods. Artioli, like many others, argues strongly for better communication and interaction between scientists and archaeologists. For many readers, I would suggest starting with section 2.4 (pp. 106-129), which has guidelines for sampling strategies and choosing the appropriate analytical method(s), cost-effectiveness, and data handling, before reading in detail about the specific methods.

Another major part (nearly 70 pp.) of the Analytical Techniques chapter is "Time and Dating." This section includes in depth explanations of physical and chemical time scales, alteration and degradation (and thus conservation issues), and the physical fundamentals of ageing. Absolute dating methods are covered in the same detail as the analytical techniques, for dendrochronology, radiometric methods (K-Ar, uranium series, and ^{14}C), thermo- and optically stimulated luminescence, electron paramagnetic resonance, and fission track dating. One box provides details on mass spectrometers of many types, including accelerator MS for dating, as well as quadrupole, multi-collector, thermal ionization, liquid and gas chromatography, and secondary ion mass spectrometers, while others focus on ^{14}C calibration, and on stable isotope analysis of carbon, oxygen, strontium and lead for provenance, environmental, paleodiet, and mobility studies.

The second major chapter of the book is on Materials and Case Studies, which begins with an overview of different materials and the significance of pyrotechnology in altering such materials, followed by sections on lithics, clay products, cement and mortar, pigments, glass and faience, metals, gems, bones and ivory, amber and resins, paper, fibers and textiles, dyes and pigments, and photographs. This focus is clearly on human-made or altered materials, or composites, and how, when and where the object was produced. The study of their mechanical and physico-chemical properties is defined as material science, and is the main approach to the archaeological applications

included in this book. Each section includes mostly up-to-date, in-depth examples of the archaeological and conservation questions being addressed for each material type (e.g. multi-method marble sourcing, ceramic firing and sintering, preservation of mortar and concrete masonry, metal crystallographic texture analysis, HPLC chromatography to identify organic materials, etc.), with numerous references. There are many black-and-white illustrations of work in the field, lab, and on the computer, with detailed descriptions/explanations for each, plus 60 color plates in the center of the volume. The examples used are geographically and chronologically quite broad, without emphasis in any area or time period. Archaeologists, conservationists, and others can easily find substantial information about the particular materials they are interested in, what questions may be addressed, references for some previous studies, and detailed information on the methodologies available.

In the three-page final chapter on "Present and Future Trends," Artioli brings up some of the recent developments including use of microbeams, 3D imaging, use of portable instrumentation (mentioning potential data quality issues), and standardized results and reference databases. Most of us would certainly agree that we need to improve our interdisciplinary networking, analytical data storage, and better support for cultural heritage tourism, economic growth, and cultural heritage laboratories.

Overall, Artioli has produced an excellent volume on the broad range of scientific methods that may be applied to archaeological and historical materials, addressing questions about material composition, production, sourcing, conservation, etc. It is very well organized and formatted, making it easy to find detailed boxes on specific methods or applications, and has very few misspellings or other errors. Along with its 69 pages of references and 18 index pages, it is not only a reference book for those seeking detailed information on specific topics, but certainly can be used as a textbook for graduate students and those interested in interdisciplinary studies, whether coming from the art & archaeology or science perspective. A background in science is not necessary to read and understand most of what is covered, although at least some prior coursework in geology, chemistry and physics would help.

While this volume would be my first choice for teaching a course on materials science and archaeology, a broader course on archaeological science would require a second textbook or series of readings to cover such topics as ancient diets through isotope or elemental analysis, ancient DNA, ethnobotanical studies (e.g. phytoliths, starch grains, or pollen), remote sensing (GPR, magnetometry, resistivity), 3D laser scanning, and computer-based data processing such as GIS.

Glass along the Silk Road from 200 BC to AD 1000. Bettina Zorn and Alexandra Hilgner, editors. Mainz: Römisch–Germanischen Zentralmuseums: 2010. 248 pp with illustrations in full colour. Price €44 (paper). ISBN 978-3-88467-148-1.

Reviewed by St. John Simpson, Middle East Department, The British Museum, Great Russell Street, London, WC1B 3DG.

The increasing application of scientific research to the analysis of ancient glass is adding greatly to our appreciation of and distinction between the major centres of primary glass production, the trade in glass chunks, ingots and cullet to secondary workshops, the separate circulation of finished products (whether vessels or beads and bangles), and the differential value given to these by different cultures depending partly on whether they had the ability or knowledge to make glass vessels themselves.

This edited volume contains twenty-one papers arising from a conference hosted by the Römisch–Germanischen Zentralmuseums in Mainz in December 2008. This was held as part of a bilateral collaboration between Germany and China on the subject of the Silk Road. The papers are divided into three sections dealing with glass from Europe, the Middle East and Central Asia, and the Far East. The contributors represent each region and include archaeologists and scientists; all of the papers are published in English.

The papers on Europe deal with the distribution and chemical composition of Celtic glass bracelets (Rupert Gebhard), chemical analysis of Late Antique vessel glass from Mayen (Sonngard Hartmann and Martin Grünewald), early medieval window glass from Switzerland (Sophie Wolf and Cordula Kessler) and two papers examining evidence for glass-working at the sixth century Dacian city of Justiniana Prima (Vujadin Ivanišević and Sonja Stamenković; Jörg Drauschke and Susanne Greiff). These are all very sound.

The second section includes five papers on evidence from Afghanistan, the Persian Gulf, Iran and Uzbekistan. Pierre Cambon discusses some of the glass found at Begram in 1937 and 1939: this is mostly Roman and entered Afghanistan via the western Indian Ocean and Indus valley. It is therefore part of western Indian Ocean trade and the maritime "Silk Road" rather than the traditional concept of overland caravan trade. Its date has attracted many different opinions but although it was probably walled up in the storerooms in about AD 100 Cambon prefers to see the objects dating over a longer time-span between the first century BC and second century AD. The addition of alternating circular lapis and turquoise(?) inlays on a cut glass bowl (illustrated here for the first time in colour) further suggests local lapidary modification of an imported vessel. Some pieces have been chemically analysed and shown to be natron glass but although the bulk were probably made in Egypt, some may have been made elsewhere using imported chunks or recycled Roman glass. The possibility of this is strengthened by other papers in this volume which imply multiple workshops on the Indian sub-continent, southeast Asia and China in the early centuries AD.

One of the most important contributions in this section is by Daniel Keller who summarises his forthcoming detailed quantified analysis of Sasanian and Islamic glass excavated at the site of Kush in present-day Ras al-Khaimah (United Arab Emirates). He shows how the late Sasanian assemblage of the fifth and sixth centuries is characterised by a relatively limited range of tablewares and miniature perfume bottles which changes in the early Islamic period to include a wider variety of shapes (and functions) including larger containers, pourers and new forms of bowls. The implications are far-reaching in terms of appreciating changing functions of glassware and distinguishing between items traded in their own right and those which are part of the packaging of consumables. The paper by Mohammadreza Riazi is a complete contrast: it gives a general overview of glass in Iran from the Bronze Age to the Islamic period but contains numerous errors of fact and interpretation and is entirely based on secondary sources. A second Iranian contribution by Reza Vahidzadeh and Ghadir Afrund discusses a pilot SEM-EDAX study of ten pieces of ca tenth-twelfth century Islamic glass excavated at the city of Rayy between 2006 and 2008. They showed that some were of normal plant-ash glass but others had elevated potash levels similar to those previously believed to be of Central Asian origin. They suggest that this might simply reflect different sources of plant and conducted experiments which show that Salsola is very high in soda whereas sugar-cane is relatively high in potash. Finally, a joint paper by Thilo Rehren, Ana Osório and Abdulhamid Anarbaev gives the first results of electron microprobe analyses of tenth and eleventh century Islamic glassware excavated at Akhsiket and Kuva in the Ferghana valley (Uzbekistan). The compositions were again plant-ash with elevated potash and magnesia levels but also high alumina which appears to reflect contamination from the kiln rather than a connection with the high-alumina glass tradition of India. There has been little reliable scientific analysis of Central Asian glass and these results are therefore rather important.

The remaining half of the papers deals with glass vessels and beads found in South and south-east Asia. This is arguably the most important part of the volume. A class of carinated bowls with a potash glass composition believed to be characteristic of southern China and northern Vietnam are presented by Brigitte Borell, who places the find of a piece at Arikamedu and rare pieces of Roman glassware from elite Han period tombs in the Yangzi delta within the context of two-way maritime trade between India and China from the 1st century BC to 1st century AD. Susanne Greiff presents further compositional analyses of glass beads from recent excavations in northern Cambodia and tentatively concludes they are of Chinese origin. Karsten Brabänder emphasises the role of Indian traders in the interaction zone connecting eastern India with Thailand but goes on to present further research and compositional analyses of the so-called Indo-Pacific monochrome drawn glass beads to suggest that south-east Asia was of greater importance in their manufacture and circulation than previously argued on the basis of the Indian data alone. Five papers by Chinese scholars (Wang Xiaomeng, An Jiayao, Jiang Jie, Yu Zhiyong, Lin Yixian) review finds of glass vessels and personal ornaments found in a palace at Guangzhou (Canton), the Famen Temple

and tombs across the country belonging to the Sui and Tang dynasties (i.e. 6th-early 10th centuries): the earliest pieces are Chinese copies of footed or stemmed goblets and bottles whereas the later pieces are Early Islamic imports. Some are high-quality, such as scratch-engraved cobalt blue plates, but others are mass-produced bowls and jars. Together they underline that glassware continued to be considered a luxury commodity during these periods even though it could be made locally. Two Sasanian cut glass bowls are also presented, both finds from graves excavated in the Tarim oasis. Compositional analyses of beads and glassware from Niya oasis also suggest imports, specifically of Roman natron glass, high alumina low lime mineral soda glass beads of Indo-Pacific type (believed to come from South Asia) and different types of plant ash glass consistent with Sasanian, Central Asian and South Asian origins. James Lankton, Bernard Gratuze, Gyo-ho Kim and Laure Dussubieux present new compositional analyses of some of the famous glassware from late 4th-early 6th century Silla tombs in Korea, as well as a re-analysis of Sasanian type plant-ash glass beads, and conclude that the beads were made in south-east Asia using imported Sasanian glass whereas the vessels have different compositions and may have been imported from northern Afghanistan. The volume concludes with overview papers by Insook Lee and Takashi Taniichi discussing some of the Chinese, Sasanian and post-Sasanian glassware found in Korea and Japan.

The title of this volume is accurate in that it is a collection of essays dealing with glass from sites scattered between Germany and Japan. Inevitably, some of the papers are weaker than others but the volume is worth having. It would have greatly benefited from an introductory overview which set out to define the problems and state of research but hopefully this will be remedied in the forthcoming proceedings of the recent conference organized by the Association for the History of Glass in York entitled *Neighbours and successors of Rome: Traditions of glass production and use in Europe and the Middle East in the later first millennium AD*.

Visualizing the Sacred: Cosmic Visions, Regionalism, and the Art of the Mississippian World. George E. Lankford, F. Kent Reilly III, and James F. Garber (editors). University of Texas Press, Austin, TX: 2011. 357 pp., 76 ill, 56 b&w photos, 1 map, 4 tables. Price US\$60.00 (cloth). ISBN: 9780292723085

Reviewed by B. Jacob Skousen, Department of Anthropology, University of Illinois Urbana-Champaign, IL, USA.

Visualizing the Sacred represents the second major volume produced by the Texas State University Iconography Workshop. Not surprisingly, the contributors present their latest work on the iconography of the Southeastern Ceremonial Complex (SECC), now known to some as the Mississippian Ideological Interaction Sphere (MIIS). In contrast to previous SECC studies, however, this volume focuses on the regional variations of particular motifs and themes. While the regional perspective is a good thing – it causes one to rethink the notion of a uniform “religion” in the southeast and thereby discourages normative interpretations that have long afflicted SECC studies

– the same issues a regional perspective could purge still persist throughout the volume.

The book is divided into five sections based on geographical region. The chapters within each section redefine regional styles, reexamine religiously-significant themes and motifs within those styles, or interpret motifs and themes using ethnohistoric records. The first two chapters are broader in scope. In Chapter 1, George Lankford introduces the regional approach. He concludes that this approach is desirable because the variation in SECC styles represents different ethnic and linguistic groups as well as varying worldviews and beliefs. In Chapter 2, James Duncan argues that the cosmological model represented in the Greater Braden art style is most similar to the Dhegihancosmological model.

Chapters 3 and 4 focus on the Middle Mississippi Valley region. James Brown compares the Braden art style, believed to have been “invented” at Cahokia, to Dhegiha Sioux beliefs. He argues that there are close similarities between dualism themes of the Braden style and the Dhegiha Sioux earth-sky dichotomy. Carol Diaz-Granados discusses the distribution and co-occurrences of rock art motifs in Missouri to better understand their meanings. Like Duncan and Brown, she sees many similarities in the themes she examines and Dhegiha Sioux beliefs.

The Lower Mississippi Valley is the subject of Chapters 5 and 6. David Dye describes the changes in the themes exhibited on pottery vessels from this region and argues that most of the ceramic art in the LMV is limited to vessels used by ritual practitioners. Kent Reilly focuses on winged serpent imagery in Chapter 6. In contrast to the winged serpent theme at Moundville, Reilly suggests that winged serpents in the LMV were associated with the Beneath World.

Chapters 7 and 8 examine objects from the Cumberland Valley. In Chapter 7, Vincas Steponaitis, James Knight, George Lankford, Robert Sharp, and David Dye argue that the Thruston Tablet imagery depicts a regional-specific version of the supernatural twins narrative. Sharp, Knight, and Lankford focus on female effigies found on Cumberland River Basin pottery in Chapter 8. They contend that these depictions signify a supernatural female figure revered in the Cumberland River basin.

The site of Moundville is treated as its own region. In Chapter 9, Knight and Steponaitis expand the Hemphill style to include different types of media as well as two new themes – the Path of Souls and “centering” concept. Lankford attempts to better understand the meaning of raptor imagery and the swirl-cross motif at Moundville in Chapters 10 and 11. He argues that the raptor was part of an assemblage of mortuary symbols and that the swirl-cross motif symbolized the Beneath World, water, and the Underwater Serpent.

The final three chapters are devoted to Etowah and the Upper Tennessee Valley. In Chapter 12, Adam King suggests that changes in media and themes in the Hightower style region were the result of political transformations in the area. Kent

Reilly and James Garber argue that the art on Hightower-style gorgets are scenes of mythical narratives that allowed elites to garner power. Finally, in Chapter 14, King and Reilly suggest that raptor imagery at Etowah may have represented the birdman, a character that may have validated elite power.

As stated earlier, employing a regional approach (as this volume has) is a substantial improvement in SECC scholarship. That said, I bring up two theoretical problems I have with this book. The first is the erroneous belief that religions, beliefs, cults, or cosmologies are contained in motifs and symbols. Though there is certainly some connection between southeastern religions and SECC iconography, religion is just as much practiced as conceptualized in art. Unfortunately, ritual and practice are ignored in varying degrees throughout the entire book. Therefore, this iconography-represents-religion concept will not sit well with those who embrace a practice-based perspective.

The second issue is the use of “meaning.” The authors imply that the variation in SECC iconography relates to multiple meanings of similar religious symbols. However, meaning varies depending on time, place, age, gender, history, emotion, and context; therefore, claiming that there was only one meaning, even within a specific geographic area, ethnic group, or language group, destroys any sense of history or agency. If there was a shared meaning of a particular motif or theme, it was undoubtedly limited to a very small group such as a medicine society or elite family.

Despite these shortcomings, *Visualizing the Sacred* is an important contribution to SECC studies and a must-read for scholars interested in this subject. While I disagree with some fundamental theoretical concepts, I agree with the contributors that variation in the SECC was just as important as the similarities, and these differences can shed light on the religious beliefs and practices of southeastern groups. Furthermore, the contributors brought up many issues that could be fruitful avenues of research. For instance, to what degree do Dhegiha Sioux beliefs and practices shed light on religious practices at Cahokia (see Chapters 2, 3, and 4)? How were the objects of the Lower Mississippi Valley used to guide the dead on the Path of Souls (see Chapter 6)? What is the identity of the woman exhibited on Cumberland River Basin pottery (see Chapter 8)? How was Moundville related to the Beneath World, and how did this relationship play out in Hemphill-style objects (see Chapter 9)? Perhaps these and other intriguing issues (which, unfortunately, the contributors did not have space to elaborate upon) will be addressed in future publications.

UPCOMING CONFERENCES

Rachel S. Popelka-Filcoff, Associate Editor

2011

1-5 August. 60th Annual Denver X-Ray Conference. Colorado Springs, CO, USA. General information: <http://www.dxcicdd.com/>

14-19 August. Goldschmidt 2011. Prague, Czech Republic. General information: <http://www.goldschmidt2011.org/>

28 August-1 September. 242nd National Meeting and Exposition, American Chemical Society. Denver, CO, USA. General information: <http://portal.acs.org/portal/acs/corg/content>

28-31 August. CANQUA/Canadian Chapter of the International Association of Hydrologists. Quebec City, Canada. General information: <http://www.mun.ca/canqua/index.html>

28-31 August. Geohydro 2011: Water and EARTH: The junction of Quaternary Geoscience and Hydrogeology, Quebec City, Canada. Special session: "Exploring Climate Change Impacts on Landscape and Hydrologic Processes at a Range of Spatial and Temporal Scales". General information: <http://geohydro2011.ca/?q=home>

2-3 September. Maritime Archaeology National Conference. Brisbane, QLD Australia. General information: <http://www.qm.qld.gov.au/maritime-archaeology-conference-2011>

5-8 September. 6th International Congress on the Application of Raman Spectroscopy in Art and Archaeology (RAA 2011). Parma, Italy. General information: <http://www.fis.unipr.it/raa2011/>

5-8 September. Rustbuckets or floating heritage - corrosion of historic ships. Stockholm, Sweden. General information: <http://www.maritima.se/sv/Verksamheten/Bevarande/Rustbucket-2011/> Contact: rustbuckets2011@maritima.se

5-10 September. Environmental Archaeology of Urban Sites. Gdańsk, Poland. General information: <http://www.archbot.ug.edu.pl/>

14-18 September. 8th International Meeting on Phytolith Research. Estes Park, Colorado, USA. General information: <http://www.phytolithsociety.org/>

19-23 September. ICOM-CC Triennial Conference. Lisbon, Portugal. General information: <http://www.icom-cc.org/244/triennial-conferences/16th-triennial-conference-lisbon-portugal/>

23-24 September. 2011 Developing International Geoarchaeology Conference. Knoxville, TN, USA. General information: <http://www.digknoxville.com/>

23-4 September. ESHE (European Society for the study of Human Evolution) Inaugural Meeting. Leipzig, Germany. General information: <http://www.eshe.eu/>

25-30 September. The Clay Minerals Society Annual Meeting. Lake Tahoe, NV, USA. General information: <http://www.clays.org/annual%20meeting/announcement.html>

26-28 September. Stained Glass after 1920: Technology and Conservation. Lisbon, Portugal. General information: <http://www.dcr.fct.unl.pt/eventos/forum-conservation-stained-glass-windows>

2-6 October. 38th Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) Meeting. Reno, NV, USA. General information: <http://facss.org/facss/index.php>.

9-12 October. The Geological Society of America National Meeting. Minneapolis MN, USA "Archean to Anthropocene-the past is the key to the future". General information: <http://www.geosociety.org/meetings/>.

19-22 October. SWBSS 2011 (Salt Weathering on Buildings and Stone Sculptures), Limassol, Cyprus. General information: <http://www.swbss2011.org/>

21-22 October. Association for Environmental Archaeology: 'Subsistence and surplus production', VU University Amsterdam, Netherlands. General information: <http://www.envarch.net/events/index.html#aea>

25-28 October. Hominid-Carnivore Interactions during the Pleistocene. Tarragona, Spain. General information: <http://hominidcarnivoreinteractions.wordpress.com/>

8-12 November. Inaugural Asia-Pacific Regional Conference on Underwater Cultural Heritage. Manila, Philippines. General information: <http://www.apconf.org/>

13-16 November. 16th Engineering Heritage Australia Conference. Hobart, Tasmania. General information: <http://australia.icomos.org/wp-content/uploads/16th-Engineering-Heritage-Australia-conference.pdf>

16-19 November. American Schools of Oriental Research Annual Meeting. San Francisco, CA USA. General information: <http://www.asor.org/am/index.html>

16-21 November. American Anthropological Association 110th Annual Meeting. Montreal, QC Canada. General information: <http://www.aaanet.org/meetings/>

17-19 November. Applied Cultural Heritage: How telling the past at historic sites benefits society. Kalmar, Sweden. General information: <http://lnu.se/about-lnu/conferences/international-conference-applied-cultural-heritage-2010?l=en>

25-30 November. The Clay Minerals Society Annual Meeting. Lake Tahoe, NV USA. General information: <http://www.clays.org/annual%20meeting/announcement.html>

1-3 December. Australian Archaeological Association. Toowumba, Queensland, Australia. General information: <http://www.australianarchaeologicalassociation.com.au/conference>

5-9 December. AGU Fall Meeting, San Francisco, CA USA. Special session on Paleoenvironments and Geoarchaeology. General information: <http://www.agu.org/meetings/>

2012

4-8 January. Society for Historical Archaeology Conference. Baltimore, MD, USA. General information: <http://www.sha.org/about/conferences/2012.cfm>

5-8 January. 113th Joint AIA/APA Annual Meeting. Philadelphia, PA, USA. General information: <http://www.archaeological.org/webinfo.php?page=10096>

25-27 January. Global Pottery 1st International Congress on Historical Archaeology and Archaeometry for Societies in Contact. Barcelona, Spain. General information: <http://www.ub.edu/gracpe/arqub/GlobalPottery/>

24-28 February. Association of American Geographers (AAG) Annual Meeting, Seattle, Washington, USA. General information: <http://www.aag.org/cs/annualmeeting>

11-15 March. Pittcon Conference and Expo, Orlando, FL, USA. General information: <http://www.pittcon.org/>

25-29 March. 243rd National Meeting and Exposition, American Chemical Society. San Diego, CA USA. General information: <http://www.acs.org>.

26-30 March. Computer Applications and Quantitative Methods in Archaeology (CAA 2012). University of Southampton, UK. General information: <http://www.southampton.ac.uk/caa2012/>

11-14 April. American Association of Physical Anthropologists Annual Meeting. Portland, OR, USA. General information: <http://physanth.org/annual-meeting>

18-22 April. Society for American Archaeology. Memphis, TN USA. General information: <http://www.saa.org/AbouttheSociety/AnnualMeeting/tabid/138/Default.aspx>

18-22 April. Paleoanthropology Society Meetings, held in conjunction with the Society for American Archaeology. Memphis, TN USA. General information: <http://www.paleoanthro.org/meeting.htm>

28 May- 1 June. International Symposium on Archaeometry. Leuven, Belgium. General information: http://www.ims.demokritos.gr/ISA/ISA_Leuven2012.php?PHPSESSID=28ebbed369e1e459bf20670622390ac3.

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(Patrick.Degryse@ees.kuleuven.be)

The subjects covered by the Symposium are grouped in the following topical fields that form the regular sessions in which both oral and poster papers are presented:

- Technology and Provenance I (Stone, Plaster and Pigments)
- Technology and Provenance II (Ceramics, Glazes, Glass and all Vitreous Materials)
- Technology and Provenance III (Metals and Metallurgical Ceramics)
- Archaeochromometry (New developments in dating techniques, novel applications, methods of combining dating strategies, new interpretation strategies, synchronization of cultures, cultural phase analysis, etc.)
- Bioarchaeology (DNA, human diet, health, mobility, demography, residues, zooarchaeology, archaeobotany, etc.)
- Field Archaeology (Remote Sensing and Geophysical Prospecting, sampling and fieldwalking strategies, in situ observations of preservation, site monitoring, etc.)
- Human-Environment Interactions (Geoarchaeology, Palaeoclimate studies, Landscape Archaeology, Environmental reconstructions, etc.)
- Integrated Site Studies (designed for archaeologists reporting combined archaeological and scientific results and interpretation of excavation, materials and environment)

5-8 June. Association of Critical Heritage Studies: Inaugural Conference. Gothenburg, Sweden. General information: <http://www.worldarchaeologicalcongress.org/events>

8-13 July. 8th International Conference Easter Island and the Pacific: Living in Changing Island Environments. Santa Rosa, CA, USA. General information: <http://islandheritage.org/wordpress/>

2-10 August. 34th International Geological Congress. Brisbane, Australia. General information: <http://www.34igc.org/>

19-13 August. 244th National Meeting and Exposition, American Chemical Society. Philadelphia PA, USA. General information: <http://portal.acs.org/portal/acs/corg/content>

20-24 August. 12th International Paleolimnology Symposium, Glasgow, UK. General information: <http://www.paleolim.org/index.php/symposia/>

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