Obituary of Norman A. Herz

Professor Emeritus Norman A. Herz died on May 28, 2013 in Athens, Georgia. Herz was an early pioneer in integrating geologic practices and ways of seeing into archaeology.

Herz’s first foray into archaeological geology came after he was commissioned as a 2nd lieutenant in the US Army’s Corps of Engineers and Air Force in 1945 and later earned his Ph.D. in Geology from John Hopkins University. Working in Greece in the early 1950s with W. K. Pritchett, Herz recognized that the then contemporary methods of marble identification of ancient monuments and statuary, such as hand specimens, optical petrography, etc., were too subjective and often incorrect. From this experience, he set out on a lifetime’s worth of research to develop a quantitative method to distinguish between the different white marble sources from throughout the Mediterranean that were used in antiquity.

Upon returning to the United States, Herz was employed by the United States Geological Survey (USGS) as an economic geologist. Six of those years Herz spent in Brazil where he was a research scientist studying the country’s mineral deposits. Not only did he learn the Portuguese language, he made a significant impact within the Brazilian scientific community. This is reflected by his election in 1981 as a Foreign Associate of the Sao Paolo State Academy of Science followed by his election in 1991 as a Foreign Member of the Brazilian Academy of Sciences.

Upon his retirement from the USGS, Herz was hired by the University of Georgia as Head of the Geology Department, a position he held until his retirement in 1992. From the 1970s on, Herz focused on distinguishing the white marble quarries of the Mediterranean. He made numerous trips to Greece, Italy and Turkey to collect a comparative marble database of all the important ancient quarries. He subjected the samples to physiochemical analyses and found that the stable isotopes of carbon and oxygen of the complex carbonate ion provided a very good separation, in scatter plots, between many of the marble types. Likewise, using straightforward bivariate statistical methods, he was able to quantify the isotopic values and determine levels of correlation. Herz’s resultant database, first published in 1985, proved very successful at answering many important questions regarding the use, trade and quarrying of this important ancient resource. Herz consulted on numerous projects including studying the marble sources of various temples and monuments at sites such as ancient Olympia, Bassai, the Athenian Agora, and Delos. He worked closely on collections from the British Museum in London, the Ny Carlsberg Glyptotek in Copenhagen, the National Gallery in Washington, DC and the Metropolitan Museum of Art in New York. He also performed critical analysis on the famous Getty Kouros. Norm’s work has been published in over 200 articles.

With the growing interest in marble studies, in 1988, he almost singlehandedly established the Association for the Study of Marbles and Other Stones used in Antiquity (AS MOSIA). Along with his colleague Marc Waelkens, Norm convened a NATO-sponsored Advanced Research Workshop (ARW) in Tuscany, Italy. This was the first ARW devoted to the Archaeological Sciences in the International Scientific Programmes of NATO. AS MOSIA’s success at integrating archaeologists and art historians with geologists and other physical scientists is
demonstrated by its 10 international conferences, each producing a published volume that can be found in archaeology and Classics libraries around the world. Herz was the first President of ASMOSIA and remained at that position until he stepped down in 2000 at which time he was named Honoree President.

Recognizing a lack of academic interaction between archaeology and scientific disciplines such as chemistry, geology, etc., Herz founded the Center for Archaeological Sciences (CAS) at the University of Georgia in the mid-1980s. The Center has become a venue for collegial collaborations among UGA faculty as well as a venue for student research with CAS faculty. Herz and his fellows instituted an undergraduate certificate program that has produced nearly 100 awardees since 1992. More recently, a Student Society for Archaeological Science (SAAS) was created and cooperates with CAS.

Herz’s dedication and commitment to archaeology was well recognized. In 1985, the American Journal of Archaeology celebrated its one hundredth anniversary. In a review of the stewardship of Ashton Sanborn as editor, only two articles were cited as “significant events”. One was the aforementioned paper by Herz and Pritchett in 1953 which “raised issues that have continued to be of interest to scholars in many specialties, and only recently have sophisticated laboratory techniques begun to answer some of the vexed questions of marble identification.” Four years later, in the January-February special issue of Archaeology dedicated to “Archaeology in the 21st Century,” George F. Bass, then president of the Archaeological Institute of America, further recognized that Norm was the “first to apply his geologic knowledge to archaeological problems.” Norm’s international reputation was further enhanced where, in 1988, he was invited to be the keynote speaker at the 18th International Symposium of the International Association of Engineering Geology where the focus of the conference was on the engineering geology of ancient works, monuments and historical sites. In 1995 the classical archaeology community recognized Norm’s contributions to archaeology by awarding him the prestigious Pomerance Award for Scientific Contributions to Archaeology of the Archaeological Institute of America. And in 2007, the Archaeological Division of the Geological Society of America awarded Herz the Rapp Award for Archaeological Geology.

In 1998, in association with his fellow UGA faculty member, Ervan Garrison, he co-authored a well-received textbook for archaeological geology, Geological Methods for Archaeology, published by Oxford University Press. Herz’s true nature as a Renaissance man is further exemplified by his 2005 historical book Operation Alacrity: The Azores and the War in the Atlantic. The book recounts the top secret operation that led to the construction of an Allied airfield in the Portuguese-controlled and therefore neutral Azores island chain that may well have changed the course of World War II. Herz took part in the operation, but until his research in writing the book he was unaware of the stakes involved with this mission.

Herz will be remembered as an excellent and caring professor and mentor who provided his students with a keen sense of how geology can contribute to our understanding of the cultural past. Herz broke down many ingrained barriers in Classical archaeology that permitted aspects of the “new” archaeology to take root in the Mediterranean. His legacy will not only be the continued application of stable isotope analysis of marble artifacts, but to the application of science in archaeology as a whole.

Written by Scott Pike (Willamette University), with assistance from Ervan Garrison (University of Georgia)

ANNOUNCEMENTS

Due to the volume of submissions for this issue of the Bulletin, the “Announcements” have been posted on the SAS Blog (http://socarchsci.blogspot.com/). Please use the links below to find more information on the following:

- “Using X-rays to Analyze Cultural Heritage”- Workshop offered by the new ACS Division “Art, Archaeology and Conservation Science” (AACS) http://socarchsci.blogspot.com/2013/07/art-archaeology-and-conservation.html


- Call for Associate Editor –Research in Archaeological Conservation http://socarchsci.blogspot.com/2013/07/call-for-associate-editor-research-in_24.html
Based on the broad range of available means for artifact analysis (Edwards and Vandenberghe 2012), and the fact that presently more and more works integrate several of these methods and techniques to solve research problems, the scope of archaeometry exhibits ever increasing distant boundaries. Proofs of this are the international meetings, symposiums and publications. Likewise, it seems to have no well-defined frontiers due to its overlap with other disciplines or specialties which can benefit from the characterization results of cultural heritage objects, such as the conservation and restoration of works.

On the other side, maritime archaeology deals with the study of human activities associated with water scenarios—seas, rivers and lakes, maritime navigation and as land operations related to them—through their surviving remains. In the case of historical sites, documentary sources have played an integral role in the archaeological investigations (Flatman and Staniforth 2006). The research in this field covers a diverse spectrum of sites worldwide. Maritime archaeology is now a “confident and maturing field that seeks to expand its horizons into areas for which methods and concepts are only just being addressed” (Catsambis et al. 2011: xiii).

The latter is especially patent in the case of archaeometry and its many applications to the sites under study—mainly shipwrecks of different periods, but also harbors, dockyards, military batteries, and coastal cities. Some of the advances made so far in some areas (e.g. artifact recognition, identification of materials and manufacture methods, dating, provenance, in situ and laboratory conservation, exploration and survey), can be highlighted. There are numerous scientific means of analyses for materials characterization and techniques available for field-related activities, post-excavation stabilization and conservation of artifacts. Most of them were not developed originally for this particular purpose (e.g. remote-sensing equipment, positioning and computer systems, Catsambis et al. 2011: Appendix). In addition, many have also been widely implemented for the study of artifacts recovered from terrestrial sites. The study and preservation of materials from underwater sites, however, has created special challenges.

Some Research Experiences in Argentina
In Argentina, archaeometric research has gained an outstanding place since the new century, partially due to a greater dialog between specialists from different fields. This is reflected in the increasing number of published studies and conferences, such as the Congreso Argentino de Arqueometria and Jornadas Nacionales para el Estudio de Bienes Culturales, allowing for a deeper approach and greater understanding of the issues.
discussed. Interdisciplinary studies of remains recovered from historical ships have not been left out of this trend. Maritime archaeology was established as a scientific specialty in Argentina during the second half of 1990, being one of the countries in South America that has been extensively focused on research on historical shipwrecks (Elkin 2011). Since then, archaeometric analyses on artifacts from XVIIth to XXth c. shipwrecks were progressively introduced, particularly related to projects conducted by the Underwater Archaeology Programme (PROAS) of the National Institute of Anthropology (INAPL), under the direction of Dolores Elkin, Ph.D. Those dedicated to investigations based on metal and wooden remains played a significant role (Elkin 2007; Elkin et al. 2012; Murray et al. 2007).

It is worth noting that a particular site has attracted the greatest attention in regard to the archaeometric analysis of shipwrecks: the HMS *Swift* (1770), a British sloop-of-war commissioned to the Malvinas / Falkland Islands, which sunk in Puerto Deseado (Santa Cruz province) (fig. 1). The remains, undergoing archaeological investigations since 1997 by PROAS-INAPL staff, were subjected to several different analyses (Elkin et al. 2007, 2011).

Analyses of wooden remains have focused on the identification of species by anatomical and structural characterization, which in some cases has specified the possible regional distribution of the wood. This information, together with other sources of data, was mainly used to study the ship’s architecture and construction, through the different structural components, and to identify the possible place of origin / shipbuilding (Marconetto et al. 2007; Murray et al. 2009), as well as the personal possessions and other items carried on board (Grosso 2013). These results also shed light on refitting activities during service and navigation routes (Castro y Aldazabal 2007). Dendrochronology analyses have recently been incorporated as a valuable tool for dating wood from shipwrecks (Mundo 2013).

Pioneering work in Latin American maritime archaeology was in the study of natural site formation processes. The focus has been on the identification and behavior of biofouling communities and wood-boring organisms which includes *in situ* experimental analysis and the characterization of sediments. This research was conducted with the aim of evaluating the physical and chemical effects of these natural agents upon the sites—especially in the case of the HMS *Swift*—with regards to the differential conservation and spatial distribution of the remains (Bastida et al. 2008; Grosso 2008). Through these kinds of studies, it is possible to have a better comprehension of both postdepositional agents and the processes that shaped underwater sites, thus enabling more accuracy in archaeological interpretations (Grosso et al. 2013).

Archaeometallurgy is one of the main areas in which analytical studies have been impacted in the region. Early in 2000, physicochemical characterization results were incorporated into the study of metal artifacts recovered from XVIIth to XXth century shipwrecks in Argentina and other countries. This research has been undertaken mainly by the Archaeometallurgy Group (School of Engineering, University of Buenos Aires), under the direction of Horacio De Rosa, Chem. Eng. These investigations were mainly conducted hand in hand with archeologists and various specialists from other institutions. The principal analytical methods and instrumentation used so far are: light microscopy, Scanning Electron Microscopy, X-ray Radiography, Energy Dispersive X-ray Spectroscopy, Wavelength Dispersive X-ray Fluorescence, and Optical Emission Spectroscopy (fig. 2).

Let us consider a brief example (Vázquez et al. 2012). In 1999, during the excavations conducted at the stern of the *Swift*, six metallic discs—preliminarily identified as coins—were recovered. Three halfpennies of George Rex were analyzed non-destructively using SEM-EDXRS and WDXRF, on their surfaces. This allowed the alloy composition and manufacturing process to be determined and the quality of the coins to be evaluated. According to the regal standards of that time, during the reigns of George II (1727-1760) and George III (1760-1820), low value coins manufactured in Great Britain were made of laminated sheets of pure copper which were cut as discs (blanks) that were later coined. The three halfpennies have a dendritic microstructure (fig. 3), due to casting in a
mold, and a chemical composition of copper with tin, zinc, iron and lead, added in different quantities. The main conclusion was that the halfpennies were counterfeits.

Figure 2. Optical Emission Spectrometry equipment (Spectro, mod. MAXx LMF 05), during the analysis of a spike recovered from the French Navy ship Fougueux (1805). Photo: courtesy of ABS Corp. 2012.

More recently, other powerful analytical tools have been applied for the first time to Argentinean underwater cultural heritage, such as μ-Raman Spectrometry and Energy Dispersive X-Ray Fluorescence (Stefaniak et al. 2008); Total Reflection X-Ray Fluorescence (Vázquez et al. 2010); Raman Spectroscopy and Fourier Transform Infrared Spectroscopy (Elkin et al. 2012). These studies identified different organic and inorganic remains and, in combination with other data, their possible function and use on board. Up until now the application of these techniques has been restricted to a small number of samples, all from the HMS Swift, but has proven to have a promising future in the field.

Figure 3. SEM image of a halfpenny surface, which shows a dendritic microstructure (from Vázquez et al. 2012).

The newly published book describing the results of archaeological research carried out in the HMS Swift (Elkin et al. 2011), compiles, in a special section, the following studies: characterization of metal artifacts (De Rosa et al.), wood objects (Castro and Murray) and glass pieces (Lavat and Ordóñez); bioarchaeological analysis of human remains (Barrientos et al.); sedimentology and investigation of site formation process (Bastida et al.); taxonomical identification of botanical remains (Picca); and the analysis of other organic and inorganic materials (Edwards and Maier; Rodríguez; Vázquez et al.). This publication is the most comprehensive work of this kind in Latin America.

Final remarks
The state of archaeometric research on shipwrecks in Argentina, and the studies described, has proven they offer great scientific potential for the field. The analyses conducted have contributed or added to topics such as the identification of artifact function and use, technological assessment (primarily materials used and manufacture methods), exploration and survey, site formation processes, deterioration dynamics, provenance, and dating. Some of the sites and research topics addressed have increased the number of available means of analysis. The research performed on these kinds of sites has been pioneering for the region. Despite the advances made, many shipwreck sites and artifacts recovered from them still have not been studied, and there are several analytical means that should be further explored.

Gould could not be more correct when he said that “there is no final answer or ultimate level of understanding the reality of the human past (...) but only relatively better ones” (Gould 2011: 61). In this regard, archaeometric analyses conducted under a well-defined research program is an outstanding way to improve the existing picture about our history. A long and prosperous way towards scientific knowledge and preservation of maritime cultural heritage lies ahead. After having covered the first steps of it, the keys for success seem to lie in communication and inclusion among the specialists and their complementary approaches. We hope this new space will help us to keep walking in that direction.

I would like to thank Robert Tykot (President of the Society), and Vanessa Muros (Editor of the SAS Bulletin), for trusting me with the responsibility of this new topic for the Bulletin. I am also grateful to Dolores Elkin and Cristian Murray, for their constructive comments to the note. It is with great pleasure that I begin this task, hoping to have encouraged the membership to help us bring this section to life.

For further information about the section and to submit news, please contact the author at: maritime.historical.archaeol@gmail.com
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Book Reviews

Ceramic Petrography: The Interpretation of Archaeological Pottery & Related Artefacts in Thin Section, by Patrick Sean Quinn, Oxford: Archaeopress, 2013. v + 254 pp., 246 figures (nearly all in color), ISBN 9781905739592, £35.00/$70.00 (paperback).

Quinn obtained a B.Sc. (Hons.) in Geology and Geography (Upper Second Class), Department of Geology, University of Keele (1993); a M.Sc. in Industrial Micropalaeontology, Earth Sciences, University College London (1995); and his Ph.D. in Archaeological Ceramic Analysis, Department of Archaeology, University of Sheffield (1999). His M.Sc. involved the paleontological study of calcareous nannofossils particularly coccolithophores which can be found in ceramics (for an explanation, see, http://www.coccoco.ethz.ch/PSQ/Science.html). Ceramic micropalaeontology was useful for answering archaeological questions of trade and exchange in Early Bronze Age Crete. From 2005-2010, he was Research Officer in Archaeological Ceramic Analysis, Department of Archaeology, University of Sheffield, and is currently Senior Research Associate in Ceramic Petrography, Institute of Archaeology, University College London. As a specialist in Thin Section Ceramic Petrography and Geochemistry, he has applied micropaleontology to archaeology, and conducted research on prehistoric ceramic production and consumption and distribution in the Aegean and Eastern Mediterranean, pre-contact hunter-gatherers in southern California, and all archaeological periods in the United Kingdom. In addition, Quinn has edited Interpreting Silent Artefacts: Petrographic Approaches to Archaeological Ceramics, Oxford: Archaeopress (2010) (reviewed in the SASS Bulletin 33(3):5-9, 2010). His training and research are brought to bear in his latest book, Ceramic Petrography, with examples drawn from his own work. He also employs other relevant examples from around the globe: France, Sweden, Spain, Romania, Croatia, the Czech Republic, Palestine, Israel, Iran, Uzbekistan, Turkmenistan, China, South Korea, Togo, Belize, Venezuela, and Peru.

Color photomicrographs of thin sections from a diverse range of artifacts, archaeological periods, and geographic regions, are used to illustrate the spectrum of compositional and microstructural phenomena that occur within ancient ceramics under the microscope and Quinn also provides comprehensive guidelines for their study within archaeology. There is no common scale for these images, but he provides measurements for each example (the range of image widths is 1.5 to 12.5 mm). Quinn
rightly points out that thin section ceramic petrography is “a versatile interdisciplinary analytical tool for the characterization and interpretation of archaeological pottery and related artifacts, including ceramic building materials, refractories and plaster.” The book is structured according to the main steps involved in the analysis and interpretation of archaeological ceramic thin sections, including classification, characterization, provenance determination, and the reconstruction of manufacturing technology. Ceramic Petrology is organized into seven chapters, each of which has its own set of references titled “Further Reading” (hence, there is no common bibliography); there are no innotes or endnotes. He knows the English-language literature, so that many references are to the publications of other well-known scholars who employ thin section petrography such as Peacock, Matson, Vince, Day, Middleton, Freestone, Whithread, and Reedy, among others. The significant thin section research undertaken at the British Museum’s Department of Scientific Research, the British School at Athens and Center for Desert Archaeology is also cited.

Quinn certainly hasn’t missed the monographic literature (British Archaeological Reports, for example) and the major and lesser-known journals: American Journal of Archaeology, American Antiquity, Antiquity, Archaeometry, Bulletin of the Geological Society of America, Hesperia, Journal of Archaeological Science, Journal of Geology, Journal of Sedimentary Petrology, Journal of the American Institute for Conservation, Medieval Archaeology, Old Potter’s Almanack, Oxford Journal of Archaeology, Proceedings of the Prehistoric Society, etc. In the “Preface” (p. v) it states that “it is assumed that the reader has a basic knowledge of optical mineralogy and the thin section petrography of rocks” and he focuses on utilitarian, coarse, earthenware, and terracotta pottery. There is a useful double-column “Index” (pp. 245-251) that emphasizes topical entries and “Acknowledgments” (p. 253), in which he cites the sources of the illustrations and provides a dedication. Quinn indicates that he wrote the majority of the text for this volume while commuting to and from London on the new high-speed train service. I appreciate this and am envious – living in the Washington DC area, most people are unable to do that on the METRO or even the Baltimore to Washington MARC line.

In Chapter 1: “Introduction to Archaeological Ceramic Analysis & Thin Section Petrography” (pp. 1-20, 16 figures, 44 further readings), Quinn provides basic definitions of archaeological ceramics, and compositional analyses (geochemical and mineralogical approaches: INAA, XRF, ICPMS, XRD, and polarized light thin sectioning), characterizing “low technology” thin section studies, their limitations, and underutilization. He also provides a brief history of ceramic petrography and discusses major publications and academic forums. Chapter 2: “Sampling, Thin Section Preparation & Analysis” (pp. 21-38, 18 figures, 12 further readings) reviews the sampling of archaeological ceramics, the preparation of thin sections, analytical equipment, texts, and other resources. He points out problems caused by the incomplete impregnation of specimens, issues with accumulated carbonarum grit/powder, and troubles using Canada balsam. Quinn also stresses the use of comparative thin sections and need for online databases. Chapter 3: “Composition of Archaeological Ceramics in Thin Section” (pp. 39-69, 44 figures, 12 further readings) documents clay matrices, fabrics and pastes, particulate inclusions, and voids. Attention is given to polyminerallic inclusions in rock fragments, synthetic aplastics (grog or chamotte) and the sources of voids (organic matter, decomposition of calcareous materials, bloating, and poor thin-section preparation) and the description of voids (sizes and shapes). Chapter 4: “Grouping & Characterization of Archaeological Ceramics in Thin Section” (pp. 71-116, 38 figures, 26 further readings) provides a lengthy discussion on visual classification (the human eye and brain as a “very powerful tool,” p. 73), sorting into petrographic fabrics, groups, and classes, and the reminder that each thin section is unique. The author also proposes and discusses the rationale for a modification of Ian Whitbread’s descriptive system first published in 1986 and 1989, which borrowed terms from soil micromorphology (c:f:v ratios of inclusions, matrix, and voids) and from sedimentology employing “eyeballing” to derive percentage estimations. Quinn recommends switching between PPL and XP and rotating the microscope stage in low to medium magnifications or by using circular polarization (p. 81). The chapter also has reviews on the characterizations of inclusions, clay matrices, and voids, and he stresses the need for full descriptions in order to determine provenance. There are also discussions on data collection (textual and modal analyses) and quantification (point, line, area, and ribbon-counting are contrasted), the use of mechanical counters, and computerized image analysis.

Quinn’s Chapter 5: “Interpreting Ceramic Raw Materials & Provenance” (pp. 117-150. 26 figures, 35 further readings) reviews thin section petrography and its goals, namely, provenance and the reconstruction of technologies. A key assumption in provenance, he notes, is that compositional studies of ancient pottery assume that potters did not travel great distances to obtain their raw materials (p. 119, see Dean Arnold 1985). Quinn
then centers on issues in interpreting ceramic raw material, differentiating primary vs. secondary clay deposits, sampling procedures, the accuracy of provenance determination, raw material prospecting and analysis, qualitative and quantitative petrographic data, and interpreting data on form, function, and sociocultural phenomena such as transport, gifting, and potter exogamy. He shows how microfossil inclusions, where present in thin sections, can aid in provenance determination. In Chapter 6: “Reconstructing Ceramic Technology” (pp. 151-212, 72 figures, 23 further readings), the author considers briefly eight primary, traditional topics in the sequential steps of production. Raw material selection; raw material processing and the preparation of paste; crushing, cleaning, sieving, and levigation; types of temper and clay mixing; aging and working; forming; finishing (e.g., surface modifications through slips, paints and glazes are minimally detailed); drying; firing; use and function; and post-depositional alteration. The importance of reconstructing firing technology is viewed as significant, and the author documents firing temperature estimation; optical and physical transformations in lime, calcite, hornblende, serpentine, biotite mica, and feldspars; atmospheres (porosity and smoking times are mentioned); and firing regime (oxidation and reduction). In post-depositional alteration, the accumulation of salts in groundwater is noted. The final chapter, Chapter 7: “Petrography of Ceramic Building Materials, Metallurgical Ceramics & Plaster” (pp. 213-236, 26 figures, 28 further readings), reminds the reader that ceramic analyses not only can be applied to pottery vessels but also to ceramic building and earthen construction materials, as well as refractory ceramics, cementitious materials, and other ceramic artifacts (smoking pipes, figurines, and clay tablets are cited as examples). Lastly, there is a much too brief and basic section on stoneware, fritware, and porcelain. There are three appendices: “Appendix: Petrographic Fabric Descriptions” (pp. 237-244, 6 figures): Unimodal Fabric Description, Bimodal Fabric Description, and Fabric Summary.

Ceramic Petrography: The Interpretation of Archaeological Pottery & Related Artefacts in Thin Section certainly can be used as a reference manual for microscope research and/or as a textbook for specialist training on thin section petrography and archaeological ceramic analysis. Two authors have published textbooks that focus exclusively on geological materials and not on ceramics. Anthony Philpotts, an igneous petrologist at the University of Connecticut, is the author of Petrography of Igneous and Metamorphic Rocks (Long Grove, IL: Waveland Press, 2003, 192 pp.). In this widely-used volume, he employs the classification of igneous rocks proposed by the International Union of Geological Sciences (IUGS) Subcommission of the Systematics of Igneous Rocks. A list of commonly used rock names (many not part of the IUGS classification) is keyed to this classification. In addition, the widely used Irvine-Baragar classification of volcanic rocks is included. There is an accompanying CD-ROM with color slides illustrating rock-forming minerals and the textures of rocks, many with text and audio annotations by the author; descriptions of the textures and structures of igneous and metamorphic rocks. Loren A. Raymond, now retired from Appalachian State University, has also written geology-oriented texts that are often used: Petrology: The Study of Igneous, Sedimentary, and Metamorphic Rocks, 2nd ed. (Long Grove, IL: Waveland Press, 2007, 736 pp.) and his newest Petrography: Handspecimen and Thin Section Petrography (Long Grove, IL: Waveland Press, 2010, 170 pp.).


Reedy’s book, which also details stone artifact petrography as well as pottery, is topically slightly different than Quinn’s monograph in that hers has nine chapters, four of which deal with geological perspectives: volcanic igneous, plutonic igneous, sedimentary, and metamorphic. Four other chapters focus on pottery products, provenance, fabrication and deterioration, and non-pottery ceramic material. The narratives are roughly the same length (vi + 256 pp. for Reedy versus Quinn’s vi + 254 pp.) but her book is in a larger format. Reedy has more color figures (341 versus 246 for Quinn); however, the striking difference is that Reedy, like Philpotts, has included an accompanying CD-ROM of the illustrations (also accessible on the Internet at
http://www.udel.edu/CHAD/petrography). In the Reedy review, I concluded that: “Readers might quibble about topics that might have been included but, in sum, although this is a relatively expensive volume, it is a superb manual and well worth the expense. … Reedy’s monograph is a welcome addition to the literature on thin-section petrographic studies. The illustrations in both print and digital forms are excellent, and the images in both plane polarized and crossed polarized light are to me as a contributor to ceramic thin-section studies, especially relevant and valuable resources.” Quinn’s modification of the Whitbread Descriptive System (pp. 80-81) is a valuable contribution to our interpretation of thin sections, while both Reedy and Quinn continue to move ahead with new methods of digital image analysis and advocate online petrographic databases. Cost is a major difference: Reedy: £70.00/$120.00; Quinn: £35.00/$70.00 (paperback; there are no hardcopy editions); both are available at lesser costs from online and discount booksellers (although one source lists Reed’s volume at $249.38, accessed 7/12/2013). Both of these monographs are significant contributions to thin section petrography and both emphasize that thin sections can (if properly conserved) provide a permanent record that can be studied and restudied many times. I’m glad to have these important resources side-by-side on my bookshelf.


The well-known and highly respected Asian ceramics scholar Louise Allison Cort, Curator of Ceramics at the Freer Gallery of Art and Arthur M. Sackler Gallery, Smithsonian Institution, Washington, DC, has authored books on historical and modern Japanese ceramics and Japanese baskets. These include _Shigarakri, Potters’ Valley_ (Tokyo: Kodansha International, 1979, reprinted 2000 and, 2006, Bangkok: Orchid Press), _Seto and Mino Ceramics_ (Washington, DC: Smithsonian Institution, 1992), _A Basketmaker in Rural Japan_ (coauthored with Nakamura Kenji, Boston: Shambhala Publications, 1995), and the online catalogue _Ceramics in Mainland Southeast Asia: Collections in the Freer Gallery of Art and Arthur M. Sackler Gallery_ (with George Ashley Williams IV and David P. Rehfuss, 2008). Since 1989, she has worked with Leedom Lefferts in conducting long-term documentation of present-day village-based production of earthenware and stoneware ceramics in Mainland Southeast Asia; see their online publications at: http://nsearchaeologyunit.wordpress.com/2012/06/07/reso urce-papers-on-indigenous-southeast-asian-pottery/ Her university-educated co-author of _Temple Potters of Puri_, Purna Chandra Mishra, is an independent researcher who has collaborated with scholars from Europe and the United States in research projects relating to the religious and cultural traditions of Orissa. He lives in Puri and maintained contact with the potters since the original fieldwork.

Louise Allison Cort and Purna Chandra Mishra have authored this remarkable nearly 500-page, 5.1 pound, highly-illustrated and detailed ethnoceramic volume, the first to describe in detail a community of potters working for the Jagannatha Temple in Puri, Orissa, eastern India. As a pilgrimage center of national importance, the temple requires earthenware in massive quantities for the creation and distribution of the sacred food, an integral feature of daily ritual and pilgrimage. The authors note that “according to Hindu custom, clay cups once drunk from must be discarded, since use makes them ritually as well as physically impure” (p. 23). The temple is supported by the patronage of successive regional dynasties and by fervent popular belief. _Temple Potters of Puri_ explores the role of the temple servants and how it affects the potters’ understanding of their work and of themselves. Three hundred potters participate as temple servants in maintaining the temple’s ritual cycle by performing their divinely assigned task. This study observes the potters’ technical prowess, sustained by devotion, but also examines the tensions within their relationships to more powerful temple servants and authorities. The role of the potter as temple servant is at once glorious, as demonstrated by texts and personal interpretations of the potters’ divinely-appointed service, and, at the same time, pathetic, as shown in the brutality of caste-based hierarchy and cash-based exchange penetrating the modern temple’s daily operations.

From 1979 to 1981, Louise Cort lived in the town of Puri, Orissa. While there, she observed the community of potters working for the Jagannatha Temple. This group is responsible for creating unglazed red earthenware pots used to cook the daily meals presented to the gods of the temple. The potters enjoy special status as temple servants, and their community has a long, rich history. This study documents the potters' technical prowess, sustained by devotion, and the research draws upon temple records, oral tradition, and the Oriya-language _Kurala Purana_, a sacred text of the potters’ community. The narrative sets out the use of the pots within the temple by the cooks, ritual officials, and other categories...
of temple servants, notably their role in the production of
the temple's mahaprasada.

The accompanying DVD, filmed originally in 16mm
color filmstock by Cynthia Cunningham Cort (Louise’s
sister-in-law), shows the potters at work, the potters' working processes demonstrating their skills and
products, and celebrating their annual festival, Kurala
Panchami. The written narrative has clear indications
where the DVD content supplements the text. In the
following review, I indicate these by “(DVD).”

In the “Acknowledgements” (pp. 8-10), the authors
discuss the Orissa Research Project (1969-1977), a very
complex interdisciplinary endeavor with which their
anthropographic work was associated. Three villages of
potters were initially studied (1979-1981), and the junior
author continued observations after that period. They
also formed two collections of potters’ tools and vessel
repertories, one of which was deposited at the
Anthropological Survey of India (Calcutta) and the other
at the National Museum of Natural History, Smithsonian
Institution (Washington, DC). There are “Notes on
Orthography and the Madala Panji” (pp. 11-14, 8
endnotes) in which they have chosen to retain original
orthographies from the period of initial research (hence,
Calcutta, rather than Kolkata). The Madala Panji is the
archival temple record of day-to-day activities at the
Jagannatha Temple, an incredible resource since it
documents activities from the year 1600 to the present. A
map of the region is also included (p. 14). An
“Introduction – Invisible Earthenware” (pp. 15-29, 23
illustrations, 1 footnote) provides an overview of the
production of the unglazed earthenware pottery, includes
a map of Puri (p. 17), describes the temple town, provides
background on “meeting the potters,” and outlines the
structure of the book. There are three parts with a total of
12 chapters, and three appendices (all reviewed below)
plus a “Glossary” (pp. 461-465) with 223 entries, a
“Bibliography” (pp. 466-471) listing 22 Orissa Project
Manuscripts, 137 published sources, and one film. An
incredibly detailed double-column “Index” (pp. 472-491)
confabulates topics and proper nouns.

“Part I: Pots in the Jagannatha Temple” (two chapters, pp.
30-93): The authors review the organization of the
temple, the temple servants, and the significance of
pottery. “Chapter 1: The Jagannatha Temple: Pilgrims,
Sacred Food, and Temple Servants” (pp. 33-59, 13
illustrations, 95 endnotes): The potters are only a single
element in a network of beliefs, rituals, and duties. The
authors detail the pilgrimages to Puri, sacred foods
(mahaprasada), the plan of the temple complex (p. 41),
temple servants consisting of Brahmin and non-Brahmin
groups, the potters as temple servants, the ca. 300 temple
potters (DVD), temple cooks, and the plan of the kitchen
(pp. 60-93, 3 illustrations, 144 endnotes): The chapter
begins with information on the delivery of pots to the
temple, the officials who receive the vessels, the
recording of the receipt of pots, the division of labor
among 36 temple servants in the kitchen, the menu,
kitchen recipes and the uses of the vessels, the
distribution of the pots among the temple servants, uses
of the pottery, and the presentation of offerings to the
deities. The concept of “pollution” (associations with
impure people and creatures or substances such as human
waste) involves both pots and food. The authors also
consider “extra offerings,” vessels for temple rituals, the
mundane use of vessels in the temple, and the disposal of
used pots which is incumbent on the user (vessels may be
reused – for example, as flower pots – or thrown away as
rubbish or discarded in a body of water, p. 23, 49, 89-90).

“Part II: The Potters’ Community at Work, and Ritual
(six chapters, pp. 94-323): The authors focus on the
potters’ perceptions of the village. “Chapter 3: The
Village” (pp. 96-141, 29 illustrations, 24 endnotes):
Topics include the structure of the village (DVD), a map
of the village (p. 99) and a house plan (p. 108), space
allocations, daily and seasonal changes in village life,
women’s clothing and tattoos, men’s clothing, the kinship
system, hereditary offices and special duties (sebas)
performed in the temple, four village specialists
(astrologer, barber, washerman, and the Brahmin).
The schooling of young children by the astrologer, marital
rites, funerals, annual festivals, community accord, and
the Malanga Puja and Duvali festival are explained.
“Chapter 4: Gifts of a God: Workshop, Kiln, Tools,
and Materials” (pp. 142-187, 32 illustrations, 26 endnotes):
The cyclical life of the potters, their workshops (DVD),
the concept of workshops as sacred space, potters’ tools
(the pivoted spooked potting wheel, beating tools
[paddle-and-anvil (DVD)], and scrapers), large updraft
outdoor and smaller indoor kilns, and kiln repairs are
documented. Also detailed are women’s work in
procuring the clay (an annual event involving the “sacred
art” of digging the clay), negotiating payment to the
landowner for the clay, and fuel procurement by the
women (casuarina, an evergreen, is used as fuel).
“Chapter 5: Work Processes” (pp. 188-223, 61
illustrations, 10 endnotes): The chapter focus on the
preparation of the clay (DVD), throwing pottery on the
wheel, (DVD), the use of the paddle-and-anvil (DVD),
the beating of large vessels as men’s work, the shaping of
preliminary forms by women (DVD), and the final vessel
shaping by women (DVD). The firing process is also
elaborated, including loading and unloading the kiln,
storing finished vessels, and delivering pots to the temple (DVD).

“Chapter 6: Work Cycles and Life Cycles (pp. 224-261, 29 illustrations, 16 endnotes): The daily, weekly, and annual cycles are explained, as is production of pots for the marketplace in Puri (DVD), saving for dowries, and other sources of income (jobs outside of the village and the sale of agricultural products). The authors review the training of boys and girls as potters (DVD), the goals of the training process, the concept of a master potter, and working into old age (some potters were in their late 70s).

“Chapter 7: Kurala Purana: Origins and Status of the Potters as an Occupational Group” (pp. 262-285, 5 illustrations, 43 endnotes): The story of the origins of the potters is related in a local text, the Kurala Purana. The authors also examine mythological origins, the origin of potter servants, the Puri potters’ interpretations of the text, and a story about the potter and the goldsmith (Ch. 47 in the Kurala Purana). Social status, religious practices, the potters’ Brahmin, and the production of pots for village weddings are also explained. “Chapter 8: Kurala Panchami: Makers, Tools and Processes Sanctified (pp. 286-323, 20 illustrations, 35 endnotes): The Kurala Purana (Chs. 14-24) could be “a model for the perfect enactment of the potters’ worship” (p. 287). Shaleha Shauni (goddess of the workshop) and the observation of the Kurala Panchami, the potters’ ancient ritual, as seen in 1979-1980, are documented: preparation (DVD), preparing images of worship (DVD), prohibitions, food, and several days of the festival are documented (first and second [DVD] and fifth days). The role of the Brahmin in these activities, resting and returning to work, and the Lakshimi Puja celebration are described. There is a prohibition against touching clay during the Kurala Panchami (p. 303).

“Part III: The Potters as Temple Servants” (four chapters, pp. 324-429): The authors review changes that have taken place in the relationships between the potters and the temple servants and administrators. “Chapter 9: Neli, The Potter’s Wife: The Potter Servants and Their Land” (pp. 326-347, 1 illustration, 50 endnotes): The potters’ role in the temple and establishment of the potter’s community as recorded in the high court records, Mandala Panji, dates to 1211. Records from the Ganga dynasty dated to 1279 and a royal land grant of 1435 are described. Differences between recorded history and oral tradition are reviewed and the loss of the potters’ lands under British administration in 1803 reviewed. The affirmation of land rights is documented more recently the Record of Rights (1954). “Chapter 10: Pottery Leadership, the Tada Seba and the Monasteries of Puri” (pp. 348-377, 6 illustrations, 67 endnotes): Tada are large clay frying pans made for the temple and delivered twice a year; Tada Seba refers to the service of making and delivering them. The authors document this service in recent times and in the past, and changes that have taken past. Other topics include offerings and the relationship to deities, the use of tadas in the temple kitchen, relationships of pots to food and to monasteries as well as arrangements made by potters with monasteries. The names of six pots used in offerings and jars for cold drinks are also discussed. “Chapter 11: The Potters and Modern Temple Servants: Duties, Rights, and Rewards” (pp. 378-397, 3 illustrations, 63 endnotes): The importance of the Record of Rights specifies the duties of potters and potters’ rights. The authors review the rights of the early 19th century, noting gains and losses, the distribution of food and cash by the temple, the right to sell pots to the temple, and gifts for the king (dating to 1467 ff.). Punishment for disobedient temple servants, dedication ceremonies, and the honorific title-surname Bishoi for potter servants are documented. Cremation pyres for deceased servants were set ablaze with flames from the temple kitchen. “Chapter 12: Incorporating Outsiders, Debating Rights and Duties: Recent History of the Potters; Community” (pp. 398-429, 5 illustrations, 37 endnotes): Village expansion, with “outsiders” immigrating to the potters’ community ca. 1750, relationships with the original families, and kinship and authority structure are discussed. The conflicts between two separate professional organizations of potters, factionalism, and clashes between the potters and temple cooks over purchasing wares from “outside” communities of potters are detailed.

There is an “Afterword” (pp. 430-432) in which the authors note changes and rising costs in the procurement of clay and fuel, problems with Indian bureaucracy, social class differences, and personal finances. Lastly, there are three appendices: “Appendix I: Technology: Terminology and Procedures (pp. 434-442, 30 illustrations), “Appendix II: Repertory of the Kumbhara Bishoi Potters” (pp. 443-450, 25 illustrations), and “Appendix III: Documents” (pp. 451-460).

This is a remarkable, comprehensive, detailed and well-documented ethnography of a single potting community and, frankly, I have not seen any publication quite like it. The illustrations are outstanding and add immensely to this splendid work and the inclusion of the DVD is significant plus. It is important to ceramic ethnoarchaeology as well as ethnography. Additional information on Puri ecology, geology, and environment would be useful to readers, especially archaeologists. For those interested in market distribution, additional information would be needed. The quantities of vessels

With Temple Potters of Puri, we have another new landmark volume illustrating ceramic ethnology and ethnoarchaeology—one for the 21st century, demonstrating in detail these potters and their economic and sociocultural conditions.

Internet Resources

PETRODATABASE is an on-line petrographic database of archaeological thin sections: http://petrodatabase.shef.ac.uk/. The database, housed at the University of Sheffield and begun by Patrick Sean Quinn and colleagues, contains full-color polarizing light micrographs and associated data from artifact research worldwide. It addresses the need for greater comparison between thin section studies of archaeological ceramics and other materials, by providing a repository for types of petrographic data that are under-represented in the published literature. The database is free to use. Simply register to browse the range of projects, fabrics and individual thin sections. A search function enables users to query the database and display micrographs of specific petrographic compositions and microstructures. New projects and can be easily uploaded and edited on-line at any time using database files containing a range of data, including petrographic fabric descriptions of any format. Using the database, academics, consultants and students can store and disseminate petrographic data, as well as accessing vital comparative material at the touch of the button, anywhere in the world. Reducing the need to handle fragile thin sections themselves will assist in the preservation of these valuable collections, ensuring their survival for future research. The success of the database relies on regular use by the petrographic and archaeological community. Three searchable datasets are featured: 1) Southern California: Anza-Borrego Desert Late Prehistoric Ceramics, 20 thin sections from 7 sites; 2) Mediterranean: Cyclops Cave, Youra, Sporades Islands, Greece: Cyclops Cave Neolithic Ceramics, 12 thin sections from 12 caves; and 3) Mediterranean: Kommos, Crete, Greece: Kommos Transport Jars, 26 thin sections. PETRODATABASE was developed at University of Sheffield as a collaboration between the Department of Archaeology and Department of Computer Science, and funded by a grant from the University of Sheffield Faculty of Arts and Humanities. There are links to two other laboratories: Fitch Laboratory, British School at Athens: http://www.bsa.ac.uk/pages/content.php?cat_id=21 and Desert Archaeology in Tucson and Phoenix, Arizona, USA: http://www.desert.com/


Past Professional Meetings

“Hellenistic and Roman Terracottas: Mediterranean Networks and Cyprus”, an international conference, was held at the Archaeological Research Unit, University of Cyprus, Nicosia, 3-5 June 2013. Welcoming addresses were given by Demetrios Michaelides, (Director of the Archaeological Research Unit, University of Cyprus), Constantinos Christofides (Rector of the University of Cyprus), and Jaimee Uhlenbrock (President of the Association for Coroplastic Studies). The meeting included a visit to the Cyprus Museum, Nicosia. There were six sessions and 11 sets of presentations. There are plans to publish the papers.


The Third International Sevgi Gönül Byzantine Studies Symposium [Üçüncü Uluslararası Sevgi Gönül Bizans Arastırmaları Sempozyumu] was held at Koç University Research Center for Anatolian Civilizations, Istanbul,
Future Professional Meetings

The 12th European Meeting on Ancient Ceramics (EMAC 2012) will be held at the University of Padua, Italy (about 40 km west of Venice) 19-21 September 2013 and is co-organized by the Department of Geosciences, University of Padova; Department of Biological, Geological and Environmental Science, University of Sannio; and Institute of Inorganic Chemistry and Surfaces – CNR. The goal of this meeting, “in accordance with former edition,” is the promotion of the methodological development and use of scientific techniques in the study of archaeological and historical ceramic materials for interpreting and solving issues on provenance, production, usage, conservation, age, and technological changes over times and places. Due to the interdisciplinary character of these type of studies, researchers and scholars from both human and science background will share their experience and results obtained in their most recently researches. This would encourage scientists with different expertise to join together in new research projects. Keeping the traditional themes of former meetings, the 12th EMAC will cover the following topics: 1) methodological developments; 2) dating ceramics; 3) experimental firing; 4) technology and provenance; 5) alteration and conservation; 6) glazed pottery; 7) ceramics as building materials; and 8) technical ceramics.

Oral and/or poster presentations are selected by the Scientific Committee on the basis of the abstracts submitted. Each oral presentation is 15 minutes long.
long, including discussion and closing arguments. For further information, including registration, travel, etc., please visit the meeting website: http://emac2013.geoscienze.unipd.it, correspond via e-mail: congress.emac2013@unipd.it or Skype: emac2013unipd. The EMAC 2013 organizers are Lara Maritan, Claudio Mazzoli, Rebeca Piovesan, Celestino Grifà, Mariano Mercurio, Luca Nodari. The list of presentations selected thus far is on the Internet at: emac2013.geoscienze.unipd.it/EMAC2013_oral_presentations.pdf

Ceramic Ecology XXVII has been accepted as a volunteered symposium by the American Anthropological Association for the annual meeting in Chicago, IL, USA, 21-24 November 2013 (the actual day and time will be announced in early August). Sandra Lopez Varela and Kostalena Michelaki (aka Konstantina-Eleni Michelaki Schwartz) are the organizers and chairs. My next column in the SAS Bulletin will provide a list of presenters and copies of their abstracts.

New Books


Presenting the latest in archaeometallurgical research in a Mesoamerican context, "Archaeometallurgy in Mesoamerica" brings together up-to-date research from the most notable scholars in the field. These contributors analyze data from a variety of sites, examining current approaches to the study of archaeometallurgy in the region as well as new perspectives on the significance of metallurgy and metal objects had in the lives of its ancient peoples. The chapters are organized following the cyclical nature of metals–beginning with extracting and mining ore, moving to smelting and casting of finished objects, and ending with recycling and deterioration back to the original state once the object is no longer in use. Data obtained from archaeological investigations, ethnohistoric sources, ethnographic studies, along with materials science analyses, are brought to bear on questions related to the integration of metallurgy into local and regional economies, the sacred connotations of copper objects, metallurgy as specialized crafting, and the nature of mining, alloy technology, and metal fabrication.


This book represents the proceedings of a Festschrift for Robert Maddin, one of the great contributors to the study of ancient metallurgy, particularly in the Eastern Mediterranean. Following a “Vorwort” (p. 9), and “Grußwort” (p. 11), contributions to the volume consist of “Robert Maddin and the Deutsches Bergbau-Museum Bochum” (Rainer Slotta, Andreas Hauptmann; p. 13),
This monograph is the definitive survey of iron tools and other fittings in use during the period c1066 to 1540AD. Exceptional in a north-western European context for its range and coverage of artifacts from both rural and urban excavations, much of the material described here was recovered during ‘rescue’ projects in the 1960s and 1970s funded by the State through the Ministry of Public Works and Buildings and their successors. The text contains almost everything necessary to identify, date and understand medieval iron objects. In scope and detail there is still no published parallel and, as such, it will be essential for almost any archaeologist working in later medieval archaeology, particularly in the fields of excavation, finds study, museums and research. Following a chapter on “Iron smelting and smithing” (Chapter 1), the volume comprises 12 more chapters discussing medieval iron tools associated with various crafts and industries, or functions. These chapters are: “Chapter 2 Metalworking tools”, “Chapter 3 Woodworking tools”, “Chapter 4 Stoneworking and plastering tools”, “Chapter 5 Textile manufacturing tools”, “Chapter 6 Tanning and leatherworking tools”, “Chapter 7 Agricultural tools”, “Chapter 8 Knives, shears and scissors”, “Chapter 9 Building ironwork and furniture fittings”, “Chapter 10 Locks and keys”, “Chapter 11 Household ironwork”, “Chapter 12 Buckles and personal equipment”, and “Chapter 13 Horse equipment”.

New Book Chapters/Articles

Thoughts on Mining and Quarrying in the Ancient Andes” (Richard L. Burger; pp. 325-334), and “Discussion: Mineral Resources and Prehispanic Mining” (Izumi Shimada; pp. 335-353).


From the book Ἡρακλεους Σωτηρος Θασιων: Studia in honorem Iliac Prokopov sexagenario ab amicis et discipulis dedicata, edited by Evgeni Paunov and Svetoslava Filipova, 2012, Faber Publishers, Veliko Turnovo, Bulgaria, comes "The Northern 'Journey' of Late Bronze Age Copper Ingots" (Diana Doncheva; pp. 671-714).

Cd deposition recorded in bogs from NW Iberia: prehistoric and historic anthropogenic contributions” (Xabier Pontevedra-Pombal, Tim M. Mighall, Juan C. Nóvoa-Muñoz, Eva Peiteado-Varela, José Rodríguez-Racedo, Eduardo García-Rodeja, Antonio Martínez-Cortizas; pp. 764-777).


**Doctoral & Masters Theses**

*A Study of Lead Ingot Cargoes from Ancient Mediterranean Shipwrecks*, by Heather Gale Brown, (Master of Arts thesis, Department of Anthropology, Texas A&M University, College Station, Texas), 2011, x, 317 pages, 18 figures, 11 tables, 2 appendices. Lead is often relegated to a footnote or sidebar in the study of ancient metals. However, the hundreds of lead ingots discovered in underwater sites over the past half-century have attested to the widespread production and trade of this utilitarian metal. Shipwreck sites allow independent dating evidence not available for many land finds. They also provide information about shipment size as well as accompanying cargo which can offer clues about trade patterns and markets for lead in the ancient world. While lead was not particularly rare nor valuable, it represents small- to moderate-scale trade that bridges the gap between luxury trade and the circulation of staple agricultural products. It thus can be viewed as a proxy for the many other perishable materials that supported daily life, such as timber, cloth, cordage, leather and pigments.

Due to the abundance of lead ingot finds, published in many different languages with great variation in the details provided, it is difficult to compare all of this material. This thesis, therefore, compiles and presents data on all published lead ingots from Mediterranean and Atlantic shipwrecks through the fourth century C.E., in order to provide a framework to analyze the ancient seaborne lead trade. Sixty-eight sites containing lead ingots, lead ore or lead minerals are included in the analysis, divided into six time periods: Bronze Age, Archaic, Classical, Hellenistic, Roman Republic and Roman Empire. A typology of ingots has been developed to allow for comparison of ingots between wrecks. The uses of lead are reviewed, organized by type of use: domestic, professional, military and infrastructural. This allows insight into both the consumers in need of lead and the volume and regularity of consumption required for each use. An overview of lead production and its economic limitations further informs the discussion of the lead trade. The final analysis considers all of these factors in creating a picture of lead trade for each of the six periods, focusing on the regions of supply, the types of demand, and the dominant forces that drove the mining and production of lead. [Abstract from thesis author]


The local production of iron was an important technology in eastern Africa up until the later twentieth century, when the use and reuse of imported iron overtook vernacular smelting industries and cemented their decline. Prior to this, the utilization of local ores had produced iron for agricultural implements, household tools and weapons, serving the needs of many generations of farmers and herders across the region.

The smelters of western Uganda enjoyed a particularly esteemed reputation in recent history, especially among their neighbors in Buganda, yet prior to this research little was known about the technologies upon which this reputation was fostered. This thesis presents the results of six months of fieldwork in Uganda and subsequent archaeometallurgical analysis, which together revealed the complexities of smelting in western Uganda between the fourteenth and twentieth centuries.

Exploring this new archaeometallurgical dataset has indicated that some iron producers in Mwenge (a particularly iron-rich region of western Uganda) were selecting manganese-rich ores with which to supplement the iron ores in the smelt, imparting a tangible effect on the process and outcomes of these smelting episodes, hypothetically increasing the metal yield and improving operating parameters. Although such harnessing of beneficial manganese-rich minerals was an unexpected and unusual finding, technological reconstructions of these smelts highlighted several other interesting features, including the consistent use of grog temper in technical ceramics, the occasional use of banana pseudostems, and variations in furnace style. Combining these discoveries with existing ethnoarchaeological and ethnohistorical data, and building upon social approaches to iron technologies, it was possible to explore some of the possible reasons for this variation, adding color and time-depth to the understanding of iron production within this region. [Abstract from thesis author]
The 18. Internationaler Kongress über antike Bronzen = 18th International Congress on Ancient Bronzes will be held September 3-7, 2013, at the University of Zurich and the Paul Scherrer Institute in Villigen. The aim of the conference is to give an update, especially on the many issues facing bronze research, which have been employed in recent years. That is why they have invited eight internationally recognized experts for keynote speeches on specific topics, who will each give an introduction to the state of research. The following topics are intended: 1) Greek and Italian bronzes in the Iron Age in Central Europe; 2) Greek bronzes in the Mediterranean region; 3) Large bronzes; 4) Roman statuettes; 5) Roman toreutic; 6) Manufacturing technology, restoration; 7) Analytics; and, 8) Written sources. All lectures - the keynotes and the contributions of each participant – will be delivered from Wednesday, to Friday, 4-6 September. A poster session also is scheduled to complement the above mentioned thematic sessions. On Saturday, 7 September, there will be excursions to an art foundry in St. Gallen (http://www.kunstgiesserei.ch/ueber-uns/sitterwerk.html) or to Augusta Raurica (http://www.augustaraurica.ch). The abstract deadline is March 31, 2013. For more information please see the International Congress on Ancient Bronzes at: www.prehist.uzh.ch/bronzekongress2013.

The eighth International Conference on the Beginnings of the Use of Metals and Alloys (BUMA VIII) will be held from September 10-15, 2013. The international conference on the “Beginnings of the Use of Metals and Alloys” (BUMA) is an interdisciplinary gathering of scientists, engineers, archaeologists and historians with a focus on production and use of metals, and with emphasis on cultural interactions and evolutions over time and space especially between the West and the Asian region. BUMA was founded in 1981 by two eminent archaeometallurgists Prof. Robert Maddin in Philadelphia USA and Prof Tsun Ko in Beijing, China, and strong support of late Professors Cyril Stanley Smith (MIT) and Yunoshin Imai (Tohoku University) from the second Conference on. From Beijing in 1981 BUMA has traveled to Zhengzhou, China (1986), Sammenxia, China (1992), Matsue, Japan (1998), Gyeongju, Korea (2002), Beijing, China (2006) and Bangalore, India (2009). BUMA VIII will be held in Nara, Japan in 2013. As the ancient capital of Japan, there are many historical and cultural attractions in Nara. The great bronze statue of Buddha (Daibutsu) in the Todaiji Temple was cast using ca.500 tons of copper in AD 747-749 and marks the beginning of the new age of the metal production in Japan.

The main theme at the Nara Conference is “Cultural Interaction and the Use of Metals”. The Conference will provide a forum for discussion on the effects of metals on the culture and history with a special focus on Asian materials. Comparative studies and case studies on ancient and traditional metallurgy from other regions can clarify the interactions between the Far East and the West through South Asia as well as Eurasia.

The Conference will cover the following themes:

1. Iron and Steel Technology
2. Copper and Bronze Technology
3. Precious Metals and Coinage
4. Casting Technology of Bronze and Iron
5. Swords and Iron Artifacts
6. History of Alloys (Brass, Paktong and Shiromé)
7. Ores and Metal Production
8. Illustrated Technology of Mining and Metallurgy
9. Experimental Metallurgy, Survey Methods and Conservation
10. Poster Session

They will try and avoid parallel sessions, and the poster session will allow maximum participation. Papers presented at the conference and accepted by the editorial committee will be published in the proceedings. Special attention should be given to the archaeological and historical background of the studies and to the interaction between specialized researchers. The conference language will be English. More information is available at the conference website (http://buma8.wiki.fc2.com/).

100th Anniversary of Stainless Steel, HMS Annual Conference, October 19-20, 2013, Cutlers’ Hall, Sheffield, UK. On August 20, 1913, metallurgist Harry Brearley (UK) made his first arc furnace cast of stainless steel in Sheffield. Therefore to mark this occasion the Historical Metallurgy Society (HMS) 2013 Annual Meeting will be a two day conference in the Cutlers' Hall in Sheffield. There will be presentations on Saturday and field trips on Sunday. For more information please contact HMSannualconf@hist-met.org or post to Eleanor Blakelock, Conservation and Scientific Research, British Museum, Great Russell Street, London WC1B 3DG, UK. More information about the conference can be found at the HMS website: http://hist-met.org/meetings/31-hms-annual-conference-oct-2013.html.

The international symposium Medieval Copper, Bronze and Brass – Dinant-Numur 2014: History, Archaeology and Archaeometry of the Production of Brass, Bronze and other Copper alloy Objects in Medieval Europe (12th-16th centuries), will be held from May 15-17, 2014,
The planned Thematic Sessions are:

1. Raw Materials and Supplies
   - Copper, zinc ore (calamine), tin and lead: mines and beneficiation, trade in raw materials and semi-finished products, supply to towns, economy, etc.,
   - Fuel: charcoal and coal,
   - Refractory ceramics: crucibles, molds, furnaces.
2. Craftsmen and Workshops
   - Sociology of craftsmen, crafts and documentary sources, such as workshop inventories, deeds, charters and financial accounts,
   - Topography: workshops in towns,
   - Archaeological excavations of workshops.
3. Techniques
   - Alloying, especially brass making,
   - Casting, foundry work,
   - Plastic deformation: smithing, wire drawing,
   - Smelting and melting (alloy making) furnaces,
   - Archaeological experiments.
4. Products and Trade
   - Trade in finished products,
   - Dissemination and circulation of products,
   - Chrono-typological studies (vessels, liturgical objects, dress accessories, exceptional products, artillery, etc.),
   - Relationships between foundries and their patrons,
   - Links with other materials such as ceramics and iron.

The first call for abstracts is out and the deadline for submissions is September 30, 2013. Abstracts can be written in either French or English, with a title and contact details of the main author, and should be sent by email (Word document) with 2500 characters maximum, including spaces, to laiton.mosan@gmail.com. These abstracts will be submitted to the scientific committee. Presentations may be made in either French or English; simultaneous translation will be provided at the conference. Abstracts of selected papers will be available at http://www.laitonmosan.org, as soon as the program is finalized. Proceedings will be published, in French or in English, after the symposium by the Service public de Wallonie – Département du patrimoine in the collection Études et documents – Série archéologie.

Previous Meetings and Conferences

The Historical Metallurgy Society (HMS) held its 50th Anniversary Conference on June 14-16, 2013, at the Quakers Friends House, Euston, and the Institute of Archaeology, UCL, London, England. This international academic conference is the culmination of a series of events marking the 50th Anniversary of the Historical
Metallurgy Society and provided a high-level 'state of the art' profile of current and future developments in the various disciplines which HMS represents. The first day of the conference began with a few introductory remarks and quickly moved into oral presentations. Papers in the first thematic session, “Origin of Metallurgy”, included “The emergence of archaeometallurgy through the second half of the 20th century” (Paul Craddock), “Prehistoric copper metallurgy in the Italian Eastern Alps: recent results” (Anna Addis, I. Angelini, Gilberto Artioli, P. Nimis), “The Origins of Metallurgy: a look under the microscope” (Miljana Radivojević), “Technological aspects of the earliest metallurgy in France: “Furnaces” and slags from La Capitelle du Broum (Péret)” (Paul Ambert, Marie Laroche, Valentina Figueroa, Salvador Rovira), “The beginnings of metal production in Britain: new light on the exploitation of ores, from the archaeological and dating perspective” (Simon Timberlake, Peter Marshall, Alan Williams), “Origins of Metallurgy: An Anthropological Perspective” (Ann Feuerbach), “The copper axes hoard of Khirbet al-Batrawy (Jordan), and the role of metal in the urban rise of 3rd millennium BC Jordan” (Lorenzo Nigro), “Early Copper Metallurgy and Arsenical Copper Production at Çalımlıe Tarlasi, Turkey, c. 3500 BC” (Loïc Boscher, Thilo Rehren, Ulf-Dietrich Schoop, Lloyd Weeks, Eddy Faber), “The origins of an origin: the development of academic interest in the question of the origins of iron technology from the 12th to 19th centuries” (Joanna Palermo), and “Between autochthony and allochthony in Southeast Asia’s historical trajectory from the Terminal Neolithic to Full State Formation, c. 1000 BC to c. 500 AD” (Oli Pryce). The first day closed with the HMS general meeting, an anniversary retrospection and prospection presentation, and a wine reception.


Poster presentations discussing metals and metallurgy consisted of “Étude technologique des fibules émaillées romaines en Gaule Belgique et Germanie : résultats préliminaires” (M. Callewaert, L. Tholbecq, H. Wouters), “Characterization ‘from manufacture to burial context’ of some artefacts from Tintignac hoard (Corrêze, France)” (S. Campodonico, G. Ghiara, P. Piccardo, M. M. Carnasciali), “Neutron diffraction measures on celtic coins from northern Italy” (J. Corsi, A. Scherillo, F. Grazzi, F. Barello, A. Lo Giudice), “Ar.Chimin evidence” (Elisa Maria Grassi), and “Elementary Analysis of Roman Enamelled Brooches in Gallia Belgica and Germania: Preliminary results” (Maxime Callewaert, Laurent Tholbecq, Helena Wouters). The complete conference program and abstracts can be found at the HMS website or at: http://histmet.org/images/pdf/HMS_AG2013_AbstractBook.pdf The international conference Archéométrie CAEN 2013, XIX Colloque du GMPCA was held from April 22-26, 2013, at the Université de Caen Basse-Normandie, France. One of the conference themes, entitled “Restitution des échanges : de la production à la diffusion” [Return of the exchange: from production to distribution], include oral and poster presentations on archaeometallurgical topics. PDF copies of the programs can be found at the conference website: http://www.unicaen.fr/archeometrie2013/.
The Timna Park International Conference “Mining for Copper: Environment, Culture and Copper in Antiquity”, an international conference in memory of Professor Beno Rothenberg, was held April 22-25, 2013, at Timna, Israel. The four-day conference included fieldtrips to the well-known copper mining and smelting sites in the Timna Valley as well as commemorative and research presentations. The first partial day of the conference included a guided tour of sites in the Timna Valley, followed by three opening session presentations – “Rothenberg’s legacy and the Timna International Conference” (Erez Ben-Yosef et al.), “Times to Remember: My Years of Collaboration with Beno Rothenberg” (Hans-Gert Bachmann), and “Cypriot copper production and trade in the 13th century BCE – a technological and economic success story from the Late Bronze Age” (Vasiliki Kassianidou) – and the day ended with an opening reception.

The second day saw a full slate of oral and poster presentations divided into several thematic sessions. Following a welcome address, presentations in the two morning sessions, “New Research at Timna and Related Issues, Parts A & B”, consisted of “Beno Rothenberg and the Chronology of Copper Smelting at Timna” (Jim Muly), “Investigations and meaning of prehistoric Faynan and Timna in archaeometallurgy” (Andreas Hauptmann), “Reconsidering Timna Site 39a without Site 39b” (John Merkel), “Excavations of the Sinai-Arabah Copper Age – Early Phase (Chalcolithic) Mine T in the Timna Valley” (Tim Shaw, Alexandra Drenka), “Food and culture in smelting sites: a view from Timna” (Lidar Sapir-Hen, Erez Ben-Yosef), “Egyptian Timna-reconsidered” (Uzi Avner), “Decorated and Plain Ceramic Wares and Beads from Recent Excavations in Timna, Site 2” (Tali Erikson-Gini), “Recent discoveries from the Timna Valley Survey” (Eli Cohen-Sasson), “Timna Chariots’ Engraving - a reassessment” (Yuval Yekutieli), “The inscription of Ramsessesemere in context” (Deborah Sweeney), “Transgendered Copper Mining in the Levant” (Laura Zuconi), and “The rabbis’ knowledge of copper alloying is implicit in laws of purity and impurity” (Dan Levene). The first two afternoon sessions, “Copper and Trade in the Southern Levant, Parts A & B” comprised “Copper Trade and the Rise of the Settlement in the South Levant Deserts in the Early Bronze Age IV” (Mordechai Haiman), “Bronze chisel at Horvat Haluqim (central Negev Highlands) in a sequence of Late Bronze to Iron Age living floors” (Hendrik J. Bruins), “The Ashalim Site and Early Bronze Age copper production in the northern Arava” (Yulia Gottlieb), “Iron IIA Pottery from the Negev Highlands: Petrographic Investigation and Historical Implications” (Mario A.S. Martin), “The Late Chalcolithic copper hoard from Nahal Mishmar (Judean Desert, Israel) in a regional perspective” (Uri Davidovich), “Revisiting the Nahal Mishmar Hoard’s place in the Chalcolithic Near East” (Aaron Shugar), “The location of Specialized Copper Production during the Chalcolithic Period as Evident from the Study of Production-Related Ceramics” (Yuval Goren), “Metal finds from Nahartiyya Excavations” (Sari Kamil et al.), and “Copper ingots from the s. Levant as...
indicators of diverse trade networking; a study of their chemical and isotopic composition and microstructure” (Naama Yahalom-Mack et al.), while the last afternoon session, “New Research at Faynan, Jordan and Related Issues”, consisted of “Intensive Surveys, Large-Scale Excavation Strategies and Ancient Metallurgy in Faynan, Jordan” (Thomas E. Levy), “Toxic Metals in Humans in the Faynan Area” (Yigal Erel et al.), “Iron Age copper production: a study utilizing mining and smelting activities at Timna and the Fenan Valley” (Christine T. Chitwood), “The ‘Araba Copper Industry in the Islamic Period: The View from Faynan” (Ian W.N. Jones), and “Nahal Tsafit; A Middle Timnian Site, ca. 4000 BC, on the Road from Feinan to Beersheva” (Steven A. Rosen). Posts from the second day consisted of “Archaeometallurgical research in the northern Hajar mountains (Oman Peninsula) during the Iron Age (1250-300 BCE)” (Julie Goy et al.), “Timna Site 34: Applied Archaeomagnetic Experiment and Excavations” (Ilana Peters, Erez Ben-Yosef), “The Mysterious Copper Scroll” (Robert Feather), “Craft Workshops at Tel Dan” (Ben-Dov, Rachel), “Timna – a UNESCO Heritage Site?” (Yoni Shtern).

Paper presented in the first two morning sessions of the third day, “Ancient Copper Production Beyond the Southern Levant, Parts A & B”, comprised “A Comparative Study of Cypriot Bronzes Dating to the Late Bronze and the Early Iron Age” (Andreas Charalambous), “King Herod and the Copper Mines of Cyprus” (Shimon Dar), “Looking Beyond the Levant: Configurations of Copper Production in the Late Bronze Age and Early Iron Age Southern Caucasus” (Nathaniel Erb-Satullo), “Production of copper at different scales in the Early Bronze Age Aegean” (Myrto Georgakopoulou), “The Great Orme Bronze Age Copper Mines in Wales: Ore to Metal Provenancing Opportunities” (R. Alan Williams), “Early Bronze Age refining of copper” (Christopher Davey), “Copper mining and smelting in the British Bronze Age – new evidence from mine sites including some re-analyses of dates and ore sources” (Simon Timberlake), “Experimental reconstruction of Bronze Age chalcopyrite smelting by employing traditional techniques from Nepal” (Gert Goldenberg et al.), “Ancient mining in gold-silver-copper deposits and metallurgical activity in Mavrokorfi area, Pangaion mount (NE Greece)” (Markos Vaxevanopoulos et al.), “The role of copper tools in early Egyptian society: the case study of Tell el-Farkha copper objects assemblage” (Marcin Czarnowicz), and “Bronze production in Pirenesse: Alloying technology and material use” (Frederik Rademakers et al.), while presentations in the third morning session, “Geology of the Arava Copper Ore Districts and Regional Tourism” consisted of “Stratigraphy, structure and copper mineralogy of the Timna Valley” (Michael Beyth et al.), “The differentiation of ancient copper from Timna and Faynan through stable Cu isotopes” (Moritz Jansen et al.), and “Copper and Environment in Timna as a platform for Earth Sciences, Archeology Study and Tourist Programs” (Hanan Ginat, Assaf Holzer). One afternoon session of presentations focusing on Nahal Amram, Israel, “New Research at Nahal Amram, Israel”, included “Renewed Research in the Area of Nahal Amram, Southern Araba” (Uzi Avner et al.), “The Amram Valley, Israel: A survey of Underground Copper Mines” (Amos Frumkin et al.), “Evidence of floods in the Amram copper mines” (Hanan Ginat), “Volume and mass estimation of mine dumps and slag heaps using high-resolution terrestrial laser scans” (Sagi Filin et al.), “Detecting ancient copper mining shafts and depth of mine-dumps using geophysical methods: Nahal Amram and Timna, southern Arava” (Uri Bason), and “Compositional Analysis of Slags from Nahal Amram” (Sariel Shalev et al.), and was followed by a guided tour of Nahal Amram, and a Closing Reception. The final day of the conference consisted of a full-day guided tour of the Wadi Faynan Copper Ore District (Wadi Faynan, Jordan), led by Andreas Hauptmann, Thomas E. Levy, Mohammad Najjar, and Erez Ben-Yosef.

A PDF version of the conference program and abstracts can be found at: http://archaeology.tau.ac.il/wp-content/uploads/2013/04/Timna_Conference_Booklet_2013-s.pdf. The proceedings of this conference are currently being organized into a publication, to be produced by Tel Aviv University. The deadline for submission is October 31, 2013, and the expectation of the editors is for a timely release date for the final publication.

The UK Archaeological Science and Association of Environmental Archaeology Spring Conference 2013 was held at Cardiff University (UK), from April 11-14, 2013. One session on the last day of the conference, “Materials: technologies and conservation (Inorganics/Metals)”, included two papers of archaeometallurgical interest “Casting a wider net: portable X-ray Fluorescence and Anglo-Saxon nonferrous metalwork” (M. Nicholas), and “Quantifying post-excavation corrosion of archaeological iron to develop management strategies for long-term storage of site archives” (D.Watkins). The final conference program and abstracts for all papers can be found at: http://ukas2013.files.wordpress.com/2012/12/ukas-2013-abstract-booklet-final1.pdf.


The British Association for Near Eastern Archaeology (BANEa) held its 2013 Conference at the University of Cambridge, January 3-5, 2013. The conference was generally entitled Metals and Colours, although these terms really only applied to the keynote lecture on the evening of the 3rd and one main thematic session on the 4th. Archaeometallurgy papers of interest included the keynote lecture “Landscape, material culture, economy and personhood: and the place of metal in the world of the EBA Levant” (Graham Philip), and papers from the main thematic session such as “A preliminary analysis of the metal production at Hirbemerdon Tepe during the Middle Bronze Age” (M. Massimino), “Calling on Clay to Make Sense of Metal: Interpreting Three Late Cypriot Bronzes” (D. Knox), “No Iron for the Arabs!” (M. Young), “The role of colour in the development of arsenical copper alloy production and use” (L. Boscher), and “Tainted ores and the rise of metallurgy in western Eurasia” (M. Radivojevic). The website for the conference is at: http://www.banea.org/conference/, and the schedule of sessions and papers can be found at: http://www.banea.org/conference/wp-content/uploads/2012/01/BANEA-2013-Schedule.pdf.

The conference XIII Congreso Internacional Sobre Patrimonio Geológico y Minero, La Minería Sostenible: Patrimonio de Hoy y Del Mañana, XVII Sesión Científica de la SEDPGYM was held in Manresa, Catalonia, Spain, from September 20-23, 2012. The Sociedad Española para la Defensa del Patrimonio Geológico y Minero (SEDPGYM)

More information can be found at conference websites: www.sedpgym.org and patgeomine.epsem.upc.edu.

Web-Based Information

The Historical Metallurgy Society (HMS) has updated its newsletter and given it a new name as well. The Crucible (starting with Issue 81 [of the original series HMS News], Autumn 2012) is now available, and it is being edited and produced by a new crew in a new home as well. The Editor (Marcos Martinon-Torres) and Assistant Editors (Loic Boscher, Siran Liu, Matt Phelps and Miljana Radivojevic), and the production location are now at the Institute of Archaeology, University College London. The first two issues, which include lots of color images, can be downloaded as PDF files at: http://hist-met.org/hmsnews81.pdf, and http://hist-met.org/images/pdf/hmsnews82.pdf.

The new editor also noted that under the new header - The Crucible - you will be able to find the usual range of news and project reports on a variety of issues; conference reports and announcements; and new sections including a “One Minute Interview” with well-known archaeometallurgists. They are keen to continue to receive your contributions in the form of news, reports and commentaries as well as suggestions to make The Crucible better. If you're not a member of HMS, do consider getting a subscription as a New Year treat: rates start from as little as 6 [British] pounds [£], and include two issues of the journal Historical Metallurgy per year as well as other perks. You can find further information at http://www.hist-met.org.

BOOK REVIEWS

David Hill, Associate Editor


Reviewed by Myles R. Miller, Geo-Marine, Inc.

Sacred Darkness is an impressive and laudable compendium of archaeological, ethnographic, and cognitive studies of human ritual and religious practice conducted within caves or similar natural and constructed features. As described in the introduction, the edited volume represents the “first attempt to address directly the role of caves in ritual practice, myth, and worldview from a cross-cultural global perspective.” As stated by Jean Clottes and Andrea Stone in their respective chapters on the Paleolithic and cross-cultural perspectives on cave ritual, if the placement of human burials within caves is
believed to be a form of ritual, then ritual performance within these natural features has an extraordinary time depth extending back at least 50,000 years.

The study of cave ritual occupies a nexus point of research concerns that includes ritual performance, landscape archaeology and ethnology, and neurological and cognitive models that attempt to explain the origins of religious experience and beliefs. The volume provides a comprehensive overview of cave ritual through a variety of archaeological and ethnographic case studies in addition to chapters outlining theoretical spatial approaches to the identification and interpretation of sacred places and ritual performance within caves.

The volume includes 29 contributions along with a concise introductory chapter by Holley Moyes. Moyes’ introduction summarizes the various sections and contributions and provides an interesting historical overview of archaeological and popular media perceptions of caves and the people who occupied them under the subheading “The Iconic Cave Man.” This section offers an intriguing proposition that our conception of human cave occupation as predominantly for shelter and habitation may be misleading, and this misconception has obscured a deeper understanding that cave occupations were primarily ritual in nature. The introduction also clarifies the definition of what a cave is and is not, the nature and importance of the dark zones within caves, and the potential for - and problems of - identifying ritual behavior in cave contexts.

The individual contributions are arranged within five sections or parts. As a whole, the contributions cover six continents and range in time from the Upper Paleolithic to contemporary ethnographic societies. The first two parts organize archaeological cave studies by Old World and New World contexts. Old World contexts include case studies in Europe, North Africa, the Levant, Tibet, and Australia. New World case studies are limited to North America with an emphasis on the eastern half of the United States, with Mesoamerica and the American Southwest providing broader geographic coverage. The third part deals with archaeological case studies of ritual in cave contexts. Many of the chapters in these sections are quite enlightening as they reveal the breadth and variety of material evidence for cave ritual across the globe.

Part Four provides a sample of ethnohistoric and contemporary ethnographic studies of cave ritual. This section illuminates how some forms of ritual may be difficult to detect using archaeological methods and approaches. The contributions to this section also draw attention to the fact that not all cave ritual was religious in nature and intent, but that caves also served as focal points for social forms of ritual action related to political power or identity formation and maintenance. The fifth and final part of the volume includes three synthetic and interpretive contributions. These contributions attempt to provide cross-cultural, spatial, and cognitive models for interpreting cave ritual. Of ultimate importance, the final section reviews behavioral and cognitive factors that may lead to a greater understanding of why caves and dark zones within caves have been of such profound cosmological significance to human individuals and societies throughout prehistory.

The volume is cleanly edited and well-organized. A minor complaint is that some photographs and figures in the reviewer’s copy are slightly faded or fuzzy, but this minor problem does not detract from the overall presentation of the chapters. The main complaint of this reviewer is that, owing to the high number of contributions in the volume, some chapters are too short. This is not truly a criticism, but rather attests to the strength and interest of the chapters in that the reader wishes there was more to read.

Although excavations of habitation strata and features in caves have been conducted since the earliest period in the history of archaeology, the study of caves as sacred places and locations of ritual is a much more recent development. This volume does an admirable job of drawing together a representative collection of current research on cave ritual and, more critically, presents a cohesive statement that cave ritual is an important and worldwide aspect of human culture. Sacred Darkness is highly recommended to researchers interested in the archaeology and ethnology of landscapes, the origins of ritual and religious practice, and cognitive and neurological models of religious origins and expression – and of course by researchers interested in the human use of caves.


Reviewed by Kari L. Schleher, Crow Canyon Archaeological Center, 23390 Road K, Cortez, Colorado, 81321, USA.

This volume explores the transmission of cultural knowledge, with a focus on the role of apprenticeship. In Chapter 1, Willeke Wendrich defines apprenticeship “as the transmission of culture through a formal or informal
teacher-pupil relation, as individuals or groups” (2012:2). Other authors explore a wide range of archaeological and modern examples of the apprenticeship process across the world. The volume builds on previous research on learning and cultural transmission in archaeology, including Jill Minar and Patricia Crown’s special edition of the *Journal of Anthropological Research* (2001) and Stark et al. (2008).

This is a valuable contribution, especially for those attempting to reconstruct the social context of learning and transmission of knowledge in the past. Many of the examples presented are ideal case studies, with clear modern and archaeological examples that successfully illustrate how to reconstruct knowledge transmission, ranging from prehistoric hunter-gather societies to modern industrialized contexts. These examples provide insight to researchers working in a variety of regions and trying to reconstruct the social context of learning the past.

Chapters 2 through 4 focus on the social context of learning and producer agency. In Chapter 2, Helene Wallaert examines variation in the pottery making apprenticeship process in New Mexico pueblos and in northern Cameroon villages. Although apprenticeship in both contexts is complex, similarities include a long period of learning and a focus on symbolic and social conventions more than technological demands. In Chapter 3, John Creese explores the differences in microvariables, often used to identify individuals in the archaeological record, as produced by students in an experimental study. Students in two experimental learning groups - social pressure and individualist - exhibited patterns dependent on the social context of learning, suggesting that archaeologists need to focus on this context as well as on individual attributes when trying to identify production groups or individuals in the past. In Chapter 4, Harald Hogseth traces the transmission of knowledge by Norwegian carpenters from the present into the past by studying tool marks and timber selection.

Environmental aspects of learning are major themes in Chapters 5 and 6. In Chapter 5, Simon Holdaway and Harry Allen explore the differences in practical and ritual training in Australian Aborigine society. They find informal learning is characteristic of practical training, but more formalized training is characteristic of ritual knowledge. Both types of training are tied to the environment. In Chapter 6, Marcy Rockman discusses ways in which hunter-gathers learn about their environment, including how different types of environmental knowledge (locational, limitation, and social) are acquired.

Chapters 7-10 and 13 address traces of apprenticeship in the archaeological record. In Chapter 7, S. Brooke Milne outlines expectations and archaeological evidence for identifying novice flintknappers in the past. Milne identifies novice flintknappers in the Canadian Arctic within the Paleo-Eskimo archaeological record. Novice material signatures are localized near raw material sources and are not found at areas more distant to these sources. In Chapter 8, Kathlyn Cooney uses a collection of ancient Egyptian ostraca to explore skill acquisition by draftsmen in ancient Egypt. In Chapter 9, Eleni Hasaki evaluates primary and secondary sources to reconstruct facets of the apprenticeship process for craftsmen in ancient Greece. In Chapter 10, Marilyn Kelly-Buccellati addresses transmission of knowledge in ancient Mesopotamia, both directly from a master to an apprentice and the use of emulation and experimentation to learn directly from a product.

In Chapter 11, Heather M.-L. Miller explores how apprentices learn and the types of learning typically involved in an apprenticeship. Miller uses examples from the modern educational system, with a focus on archaeological lab classes and experimentation. In Chapter 12, Lise Bender Jorgensen explores the vocabularies associated with theoretical and practical knowledge. She argues that developing a vocabulary to describe practical knowledge or skill is essential in the transmission of this type of knowledge. In Chapter 13, Wendrich summarizes the volume with some practical considerations for evaluating knowledge transfer in the archaeological record.

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**UPCOMING CONFERENCES**

Rachel S. Popelka-Filcoff, Associate Editor

**2013**


**2014**


Abstract deadline December 16 2013.


[Due to the volume of submissions, space is limited and only an abbreviated list of upcoming conferences is available in this issue. The complete list of upcoming conferences can be found on the SAS Blog (http://socarchsci.blogspot.com/) ]
SAS BULLETIN
Newsletter of the Society for Archaeological Sciences

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