SAS Bulletin

Newsletter of the Society for Archaeological Sciences

Volume 32 number 1 Spring 2009

Heritage Matters

While often thought by many as being "old" and "ancient" and therefore only of interest to those heading to the museum for a weekend family outing, the archaeological record is, as readers of the *SAS Bulletin* know well, a heck of a lot more than infotainment. Who among us doesn't recall the tragic destruction of the Buddhas of Bamiyan just a few short years ago, or the pillaging of the Iraqi National Museum? Heritage matters (as it always has).

Countless other assaults on cultural heritage from around the globe have since emerged, although their stories haven't quite grabbed international headlines. This is because most destruction of cultural heritage today takes place in pace with development—erecting new buildings, laying new highways, and so on. While the "adverse impacts" of such work are sometimes "mitigated," in many instances they are not.

Over the past few years a growing number of interdisciplinary books and manuals have emerged showing how researchers from diverse backgrounds—in geography, engineering, and computer science—have stepped forward to help. But what contributions can archaeometrists and "archaeological scientists" make?

Friend or foe? While the bulldozer can be symbolic of construction (and sometimes destruction of cultural heritage), it is sometimes used by archaeologists to investigate archaeological sites rapidly.

The question is addressed in this issue of the *Bulletin* by SAS President-elect Sandra López Varela and colleague Christopher Dore, who consider the impending impact of Mexico's recent infrastructure development initiatives that may endanger, damage, destroy, and all together wipe out countless tangible expressions of Mexico's cultural heritage in the coming years.

López Varela and Dore argue that we can make a difference by using technologies at hand to help predict the places most sensitive to development efforts. In their contribution to this issue of the *Bulletin*, they explore the use of geographic information systems applied as a planning tool for development projects—one that promises to help developers sidestep archaeological sites and resources. Other approaches come to mind as well, such as those aimed at collecting and evaluating remotely sensed data or those concerned with using physicochemical data to establish provenance.

Like the Mexico case, the United States and other countries about to embark on bold development plans in the near future need to be aware of the value and sensitivity of cultural heritage. And, with our skills of being able to detect and protect archaeological resources, who better to ring the warning bell and come to the rescue than the members of the Society for Archaeological Sciences?

E. Christian Wells, Editor

In This Issue

Employment Opportunities

Paleo Research Institute in Golden, Colorado is seeking a Macrofloral Analyst to join our existing staff. The successful candidate will have experience in sorting macrofloral samples and identifying botanical remains. This person will become integral to our staff, working both with Kathy Puseman on macrofloral remains and also participating in multi- and inter-disciplinary studies with other staff. PRI is a small business, with a small business atmosphere. Please see our website (www.paleoresearch.com) for more detailed information. The position starts when we find a good match for our needs and with our existing staff.

The History Department of East Carolina University invites applications from experienced Archaeological Conservators for a new renewable fixed-term position to begin on August 17, 2009 in its Program in Maritime Studies, a distinguished graduate program offering the MA in nautical archaeology and maritime history. Completed M.A. is required, and candidates must be certified to dive, at the time of application. The holder of the position will be responsible for laboratory and field conservation (50%), teaching (40%), and field project planning and service (10%). Specific duties will include teaching courses in conservation techniques and field methodologies, grant and report writing, use of remote sensing apparatus (magnetometer, side scan, ROV, and supporting software including Hypack and ArcView), and conservation laboratory management. Applicants must complete a candidate profile and submit a curriculum vitae and letter of application online at http://www.jobs.ecu.edu. In addition, applicants should arrange for original graduate transcripts and three current letters of recommendation to be sent to: Dr. Lawrence Babits, Chair, Search Committee, Department of History, East Carolina University, Greenville, North Carolina 27858-4353. Screening will begin January 2, 2009 and continue until the position is filled. ECU is an Equal Opportunity, Affirmative Action University that accommodates individuals with disabilities. Individuals requesting a disability accommodation should call the ECU Office of Disability Support Services at 252-737-1016 (Voice/TTY/Relay). Proper documentation of identity and employability are required at time of employment.

New York University is establishing a campus in Abu Dhabi, United Arab Emirates, and invites applications for one or more faculty positions at any level (assistant, associate or full professor) to anchor the multidisciplinary concentration in the Ancient World. This program will cover the geographical span from the Eastern Mediterranean to East Asia and a time period from late prehistory to the coming of Islam. We encourage applicants with broad training in Old World archaeology, and have a particular interest in applicants with expertise in Iran, the Arabian Gulf, Central Asia, South Asia, and East Asia. Preferred candidates will have an active agenda of research, publication, and undergraduate teaching, as well as an interest in conducting an archaeological field program for undergraduates. Ph.D. at time of appointment is expected. The teaching load is three undergraduate courses per year (semester system), including one in the core curriculum. The terms of employment are competitive compared to U.S. benchmarks and include housing and educational subsidies for children. Faculty may spend time at NYU in New York and at its other global campuses. The appointment may begin as soon as September 1, 2009 but could be delayed until September 1, 2010. New York University Abu Dhabi will be a new campus of New York University, consisting of a highly selective liberal arts college, distinctive graduate programs, and a world-class Institute for advanced research, scholarship, and creative work. NYU Abu Dhabi will recruit faculty of exceptional quality in teaching and in professional accomplishment. It will seek students of demonstrated excellence and remarkable potential from across the globe. It will offer undergraduate and graduate degrees, and extraordinary opportunities for research and for creative work across the Arts, Humanities, Social Sciences, Sciences, and Engineering. Situated at a new crossroads of the world, it will have the resources and commitment to become a leading center of intellectual pursuit, collaboration, and impact. Moreover, NYU New York and NYU Abu Dhabi will be integrally connected, together forming the foundation of a unique global network university, actively linked as well to NYU's study and research sites on five continents. NYU Abu Dhabi's first class of students will arrive in fall 2010; its research and public programs have commenced this fall. The review of applications will begin on February 15, 2009 and will continue until the positions are filled. Send vita, statement of research and teaching interests, representative publications and three letters of reference via email to nyuad.humanities@nyu.edu, or send a hard copy to: NYUAD Ancient World Search Committee, New York University, 70 Washington Square South, Rm. 1242, New York, NY 10012. Information concerning the faculty, programs, facilities and benefits of NYU Abu Dhabi, can be obtained at: http://nyuad.nyu.edu.

The University of Memphis, invites applications for a tenure-track Assistant Professor position in the Department of Earth Sciences (DES) beginning in Fall 2009. PhD is preferred, but ABD candidates will be considered for this position. Review of applications will begin December 1, 2008, and may continue until the position is filled. The ideal candidate will have the ability and interest to teach and conduct research in some of the following areas: human land use-response to environmental or climate-change, paleoclimatology, paleoecology, geomorphology, microstratigraphy, or soils. The successful candidate will join a growing, vibrant faculty who are engaged in national and international interdisciplinary research, and will share in the future development of late Quaternary to historic research in geoarchaeology, active tectonics, and landform/land use evolution. Candidates should have a strong commitment to field research as well as to teaching and mentoring at the BS, MS and PhD levels. Visit our website at http://cas.memphis.edu/DES. Apply electronically by visiting https://workforum.memphis.edu. Please note that only electronic submissions will be accepted. If you have questions, please contact Dr. George Swihart (901-678-2606; gswihart@memphis.edu) or Dr. David Dye (901-678-3330; daviddye@memphis.edu), Search Committee Co-chairs,

Department of Earth Sciences, 001 Johnson Hall, University of Memphis, Memphis, TN 38152.

UCLA Terasaki Postdoctoral Fellowship in Japanese Studies. The UCLA Terasaki Center for Japanese Studies invites applications for a 1-year postdoctoral position, for the 2009-10 academic year. The fellow will be expected to teach a one-quarter undergraduate course and present one public lecture while in residence, and to participate actively in Center colloquia and other public programs during the fellowship year. The Center welcomes applications from around the world. Applicants must have a Ph.D. degree from an accredited university in hand by June 30, 2009, but have earned it no earlier than January 1, 2005 to be considered for the 2009-10 fellowship year. Review of applications will begin March 2, 2009, and there is no guarantee that late applications will be considered. The application form is available online at the website, http://www.international.ucla.edu/japan/funding/article.asp?parentid=85480. The selection committee will evaluate applications on the basis of: 1. The significance of the proposed research and its relevance to the aims of the Center; 2. The quality of previous research and experience and the ability of the applicant to benefit from the Center and UCLA; 3. The contribution an applicant is likely to make to the Center and UCLA in their teaching, research and collegial interactions. Applicants must submit a cover letter, curriculum vitae, a statement of up to 1,500 words describing the proposed research project during the fellowship year, and an article-length writing sample. Three letters of reference should be sent under separate cover, directly to the Center. Compensation includes an annual salary of $50,000, health coverage, up to $5,000 for research-related expenses, office space, and access to a computer, the UC library system and other facilities available to members of the UCLA community. UCLA is an affirmative action/equal opportunity employer. UCLA values diversity among its students, staff and faculty, and strongly encourages applications from women and underrepresented minorities. U.S. citizenship is not a requirement. The final selection will be announced in April 2009. Application materials should be addressed to Terasaki Fellow Selection Committee, 11282 Bunche Hall, UCLA, Los Angeles, CA 90095-1487. For questions, please contact Mariko Bird at bird@international.ucla.edu, or visit http://www.international.ucla.edu/japan/study/terasaki.asp.

The College of Social and Behavioral Sciences at The Ohio State University is pleased to announce the establishment of the SBS Diversity Postdoctoral Fellowship Program. The goals of the Fellowship Program are to support promising scholars who are committed to diversity in the academy and to prepare those scholars to enter tenure track faculty positions. We are particularly interested in receiving applications from individuals who are members of groups that historically have been underrepresented in the American professoriate. Fellows will be affiliated with one of the eight academic units of the College of Social and Behavioral Sciences: Anthropology, Economics, Geography, Communication, Political Science, Psychology, Sociology, and Speech and Hearing Science (additional information at http://sbs.osu.edu). The College also houses four interdisciplinary research units: the Criminal Justice Research Center, the Center for Human Resource Research, the Center for Urban and Regional Analysis, and the Initiative in Population Research. Fellows may also have the opportunity to participate in the activities of the Kirwan Institute for Race and Ethnicity, a multidisciplinary center founded jointly by the Colleges of Social and Behavioral Sciences; Humanities; and Law. Eligibility: Applicants must have completed all requirements for a doctoral degree in the social sciences by August 2009. Preference will be given to individuals who are within five years of their degree. Applicants must be committed to an academic career. Applicants must be a citizen of the United States. Awards: Up to three fellowships will be awarded. The appointments are intended for two years, with re-appointment for the second year contingent upon a successful performance review. The appointments will begin in September 2009. The fellowships provide a $40,000 annual stipend, university medical benefits, and some support for travel and research expenses. Application Process: Required application materials: (1) Applicants should clearly identify a unit within the College of Social and Behavioral Sciences at OSU with which they would be affiliated during the Fellowship period, and are encouraged to suggest one or more tenured faculty members within that unit who could serve as a host and mentor; (2) a curriculum vitae; (3) a one page dissertation abstract; (4) a statement outlining the specific research proposed to be undertaken during the Fellowship period, and the significance of that research (four-page limit, double-spaced); (5) a personal statement describing the applicant's background and commitment to the goal of diversity in higher education (three-page limit, double-spaced). Applicants should submit all of these materials electronically in Microsoft Word. (Please identify all of the documents with the last name and document type, e.g., smithcv.doc or smithresearchstatement.doc.) In addition, names and contact information for three referees should be submitted electronically. All materials must be received by March 15, 2009, and should be submitted to sbspostdocs@polisci.osu.edu. Questions can be directed to Prof. Kathleen M. McGraw (mcgraw.36@osu.edu).

Awards, Fellowships, and Training

Scottish Alliance for Geoscience, Environment and Society PhD studentships. Below are details of three studentships advertised under the SAGES initiative. Please note that for topic 1 and 2 you should apply directly through the University of Aberdeen and for topic 3 you should apply though the University of Stirling. Additionally it is required that you complete a SAGES application form (available from the SAGES website). Please follow the links for more details and you are advised to contact the lead supervisor for further information. 1. The effect of climate change and human activity upon the

long term evolution of the Scottish landscape: a multi proxy, high resolution approach. Contact Tim Mighall, Department of Geography and Environment, University of Aberdeen for further information. 2. Effects of climate change on hydrological functioning of upland catchments. Contact Doerthe Tetzlaff, Department of Geography and Environment, University of Aberdeen for further information. 3. Modelling landscape sensitivities: Are future human-induced landscape changes quantifiable? Contact Paul Adderley, University of Stirling for further information. See also, http://www.sages.ac.uk. The closing date for applications is on 15th February, 2009.

Canadian Association of Palynologists Student Research Award. In an effort to recognize students' contributions to palynological research, the Canadian Association of Palynologists (CAP) is pleased to announce an annual student research award. The award is open to any undergraduate or graduate student who is a member, in good standing, of CAP, regardless of their nationality or country of residence. The intent of the research award is to support student research with a strong palynological component. The award consists of a three-year membership in CAP, a certificate, and $200 (CND), to be put toward some aspect of the student's research. The application should consist of: (1) a letter of support from their supervisor; (2) a CV; and (3), a one-page statement outlining the nature of the research project, its scientific importance, the approximate timeline to completion of the project, and the aspect of the research the funds would be directed toward. The application should be submitted to the CAP President-elect by e-mail on or before March 1st, 2009. Applications will be accepted in both French and English. The reference letters should also be e-mailed to the President-elect by the March 1st deadline. Only one award will be given per year, and there will be no limit to the number of times a student can submit an application. The winner of the 2009 competition will be announced at the CANQUA meeting in Vancouver in May. Completed applications and questions concerning the award should be sent to the CAP President-elect, Matthew Peros, at mperos@uottawa.ca. For more on the Canadian Association of Palynologists, as well as information on how to become a member, please visit our website at http://www.scirpus.ca/cap/cap.shtml.

East African Rift Drilling Site Proposals. As an outcome of the recently held International Continental Scientific Drilling Program/NSF sponsored workshop "Scientific Drilling for Human Origins: Exploring the Application of Drill Core Records to Understanding Hominin Evolution," proposals are being sought for high priority scientific drilling targets in the East African Rift of relevance to human evolution. Proposed drilling targets should focus on lacustrine or similar deposits with strong potential for providing high resolution paleoclimate and paleoenvironmental information, and should target strata in the 6-0 Ma time interval. The highest priority sites will be those that can be drilled with truck-mounted, relatively portable drilling systems and have road access and water (for drilling) availability. Barge, ship or platform-mounted drilling operations on lakes and in the ocean will not be considered at this stage but will form the focus of future drilling planning. All proposals should address the following criteria: location and age of deposits; quality of lacustrine sediment record of direct interest to human; compelling science issue to be addressed by drilling. Intersection of high; paleoclimate and/or paleoenvironmental record with important issues in paleobiology and human evolution; stratigraphic completeness, continuity and resolution; existence of baseline stratigraphic, facies and paleontologic data; existence of supporting subsurface information from correlative outcrops; geophysics or prior drilling; existence of an age model for the sediments through the target interval (geochronology); general challenges to drilling the site and obtaining subsurface; information (e.g., suitable terrain for site survey geophysics); probability of success; road access; access to abundant water supplies nearby for drilling operations; security issues; and complexity of operations, local impact/cooperation (community and environmental). Proponents should be prepared to become rapidly involved in subsequent geophysical and logistical site survey proposals and follow-on fieldwork should their sites be selected for detailed consideration in a first round of drilling. Proponents should also be prepared to take the lead in organizing logistics (permitting, transport etc.) for their proposed areas. Priority will be given to proposal teams that include expertise in both earth science and paleoanthropology. Proposals should be 3-5 pages in length, not including references, and may include up to two figures. All proposals should be submitted as PDF files to Andrew Cohen (cohen@email.arizona.edu), Department of Geosciences, University of Arizona, Tucson, AZ 85721. The deadline for proposal submissions for consideration for inclusion in an upcoming ICDP drilling proposal is 1 March, 2009. Please feel free to contact Andrew Cohen with any questions regarding this project.

R.E. Taylor Student Poster Award Competition. The Society for Archaeological Sciences will sponsor a contest for the best student archaeometric poster presented at the Annual Meeting of the Society for American Archaeology (April 22 through 26: Atlanta, Georgia, USA). The prize will include a one-year membership in the SAS, including the quarterly *Bulletin*, and a monetary award of $100 (US). The student should be the first author and the presenter of the poster. Entries will be judged on the significance of the archaeological problem, appropriateness of the archaeometric methods used, soundness of conclusions, quality of the poster display, and oral presentation of the poster. The student author must be present at the poster session in order to compete and respond to judges' queries. Undergraduate and graduate-level candidates are welcome to apply. To enter, please submit the following information in the body of an email: student's name, university/college, department, and standing; contact email and postal address (for student); coauthors' names and affiliations; title of poster; complete abstract text (as submitted to SAA); and poster session title, date and time. Deadline for entries: April 15, 2009. Email entry information and direct questions to: AJ Vonarx, SAS Vice-President for Membership Development, ajvonarx@email.arizona.edu.

Conference News and Announcements

Historical Metallurgy Society Spring Meeting. Urban archaeometallurgy: historical metallurgy in towns and cities, 21 February 2009, Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY. A great number of archaeometallurgical remains are found in urban contexts. These include, among others, foundry remains, forges, goldsmith workshops, mints, assay offices or just stray finds of crucibles, slag or metal objects. Although these assemblages are increasingly studied by specialists, many remain unidentified or neglected in archaeological archives. Urban metallurgists used skills and techniques quite different from those used by miners and smelters, and played an important technological and economic role in urban life. Their endeavors were closely related to those of other crafts, and their products were directly relevant to those living in the immediate vicinity. Thus, the documentation and study of urban metallurgical workshops and artefacts provides an interesting path to the functioning of historical towns and cities, as well as insights into relatively unexplored areas of historical metallurgy. This workshop aims to provide a forum for the presentation of studies on metallurgical remains excavated in urban contexts. To provide a balance for the focus on ferrous metallurgy of previous HMS workshops, we particularly encourage presentations of research on non-ferrous and noble metals, and we welcome studies of both metalworking debris and finished artefacts. The chronological and geographical remit is purposefully broad, but we hope to showcase studies of materials recovered during rescue excavations in historical cities. The underlying intention is to provide examples of the use of such assemblages for research purposes, maximizing their informative potential and saving them from neglect. By inviting urban archaeologists and finds specialists as well as archaeometallurgists, we also intend to create a network for the development of future projects. If you would like to present a paper, please send a 200-250 abstract to Marcos Martinon-Torres, m.martinon-torres@ucl.ac.uk, http://hist-met.org/2009workshop.html.

Flooding and climate during the last two millennia, European Geosciences Union, General Assembly 2009, Vienna, Austria, 19 - 24 April 2009. Abstract deadline: 13th January 2009. The session is co-listed in under the Geomorphology, Hydrological Science, Climate and Natural Hazard Divisions. GM3.3/CL65/HS13.03/NH2.4. We have secured several invited contributions (including the British Hydrological Society sponsored lecture) and are aiming for a stimulating and interdisciplinary session. The prediction of extreme floods in response to global warming is one of the major uncertainties in the IPCC (2007) report. Flood frequency and magnitude are controlled by a myriad of factors including precipitation (intensity and duration), antecedent conditions, snowmelt, land cover and channel/floodplain morpho-dynamics. Under some IPCC scenarios it is likely that floods occurring within Europe will increase in frequency and magnitude due to warming and increased atmospheric moisture. Evidence from sedimentary and documentary records of palaeofloods indicates that cold (and sometimes dry) periods of the Little Ice Age were characterized by floods of greater magnitude than observed during the instrumental period. In part this may be due to increased snowmelt, but other explanations include: changes in the frequency of flood-producing circulation patterns; increased frequency in blocking high/low pressure systems located over central Europe; fluctuations in the North Atlantic Oscillation (NAO); or changes within Atlantic storm tracks. There is also increasing evidence to suggest that the period spanning 800-1200 AD was one of greater flooding, but whether this is in response to warming associated with the Medieval Warm Period or colder phases is not yet known due to geochronological uncertainties in the flood record. This session aims to bring together an interdisciplinary spectrum of scientists from across the Geosciences (geomorphology, hydrology, meteorology/climatology, geoarchaeology and environmental history) to examine and discuss our understanding of the relationships between flooding and climate for the last 2000 years. Past perspectives over this duration of timescale are critical for developing a robust understanding for the future. In particular the focus of the session will be multi-proxy reconstructions of: a) Climate and event-based meteorology (e.g. temperature and moisture, NAO); b) Flood magnitude and frequency; c) Human impacts on flood frequency and magnitude; d) Archaeological and/or historical evidence of societal response to flooding; e) External forcing on flooding (e.g. solar activity, volcanic aerosols). Incorporating a wide range of evidence from sediments and landforms, historical documents, (geo)-archaeological records and long term measurement series, alongside the application of modeling approaches, will ensure the desired multidisciplinary cross-spectrum of scientific interests.

TECHNART 2009, Non-destructive and Microanalytical Techniques in Art and Cultural Heritage Research, Athens, Greece 27-30 April 2009. The aim of TECHNART 2009 is to provide a scientific forum to present and promote the use of analytical spectroscopy techniques on the field of Cultural Heritage. The conference offers an outstanding and unique opportunity for exchanging knowledge on leading edge developments. Cultural Heritage studies are interpreted in a broad sense, including pigments, stones, metals, glass, ceramics, chemometrics on artwork studies, resins, fibers, forensic applications in art and archaeology, conservation, etc. TECHNART 2009 is organized by the Institute of Nuclear Physics at NCSR "Demokritos", Athens and the Institute of Electronic Structure and Lasers at FORTH, Heraklion, Crete (IESL-FORTH). Analytical and Bionalytical Chemistry (ABC) will dedicate a special issue to TECHNART 2009. Selected papers will be published following the normal peer-review process of the journal. Conference topics include: X-ray Microanalysis (XRF, XRD, SEM-EDX) Confocal X-ray Microscopy (3D Micro-XRF, 3D Micro-PIXE) Synchrotron, Ion Beam and Neutron based techniques/instrumentation; FT-IR and Raman microscopy; UV-Vis and NIR absorption/reflectance and fluorescence Laser-based analytical techniques; Magnetic resonance techniques; Chromatography & Mass spectrometry (GC, HPLC); Optical imaging & coherence techniques; and Mobile spectrometry & remote sensing.

Putting the Ecology back into Paleoecology, special session at CANQUA, May 3-8, 2009, Simon Fraser University in Vancouver, Canada. Biotic remains preserved in Quaternary archives form the basis for much paleoenvironmental and paleoclimatic reconstruction. These fossils are often the only means to examine past ecosystems and the subsequent inference of paleoclimates. With the recent importance of global climate change to society, the ecological application of paleoecological studies appears to have been neglected. This session will focus on the application of paleoecological techniques in understanding long-term ecosystem structure and function leading to inferences regarding ecological properties such as resilience, ecosystem thresholds, disturbance regimes, and testing hypotheses about ecological processes such as competition, species interactions, and migration. The intent of this session is to focus on the ecological component of Quaternary science, the mechanism that makes fossil-based paleoenvironmental reconstruction possible. This session is sponsored by the Canadian Association of Palynologists. Abstracts are due March 13, 2009. For more information, please email us or check the conference website: http://www.sfu.ca/earth-sciences/CANQUA.

Magnetism and Other Geophysical Techniques Applied to Archaeology, American Geophysical Union, 2009 Joint Assembly (The Meeting of the Americas), 24-27 May 2009, Toronto, Ontario, Canada, http://www.agu.org/meetings/ja09. Session conveners: Rob Sternberg, Franklin & Marshall College; rob.sternberg@fandm.edu; Annick Chauvin, Université de Rennes; Annick.Chauvin@univ-rennes1.fr; Stacey Lengyel, Illinois State Museum; slengyel@museum.state.il.us. Magnetism is used in archaeology in several ways: archaeomagnetism, or the remanent magnetization of archaeological materials; use of magnetic properties for determining archaeological provenance; magnetic surveying at archaeological sites, and use of magnetic susceptibility on the surface and subsurface at archaeological sites. This session invites submissions on any of these topics, especially involving novel approaches, or the application of other geophysical methods to archaeology. Abstract submission deadline: 04 March, 2009. Abstract submission information: http://www.agu.org/meetings/ja09/program/abstract_submissions.php.

DIG 2009: Developing International Geoarchaeology Conference and Geochemical Characterization in Archaeology Workshop, May 25-29, 2009, McMaster University, Hamilton, Canada. Developing International Geoarchaeology (DIG) is the title of a series of very successful international conferences. The goal of DIG is to bring together a wide variety of researchers, practitioners, students and industry partners in this diverse and interdisciplinary field in order to facilitate discussion, stimulate research and promote international scholarship in geoarchaeology. The DIG 2009 event is jointly organized and supported by the Department of Anthropology, the School of Geography and Earth Sciences and the Centre for Neutron Activation (CNAA) at the McMaster Nuclear Reactor. We encourage participants to discuss all geoarchaeological topics including: Method and Theory in Geoarchaeology, Geochemical Characterization Studies, Soil Micromorphology, Palaeoenvironmental Reconstruction, Frontiers in Geoarchaeology, Submerged Landscapes and Underwater Archaeology, Human-Environment Interaction, Site Formation Processes, Methods in Spatial Analyses, Dating Methods. Prizes for the Best Student Paper and Best Student Poster have been generously donated by the Canadian Geological Foundation Thayer Lindsley Endowment Trust Fund. The Geochemical Characterization in Archaeology Workshop will take place at the Centre for Neutron Activation Analysis at the McMaster Nuclear Reactor. Participants will have the opportunity to gain hands-on experience with Instrumental Neutron Activation Analysis (INAA), to attend informal discussions led by researchers in this facility, and to learn about the practical applications of INAA in geoarchaeological research. This workshop will be suitable for both beginners and those with previous INAA experience. For those who have no previous experience with INAA, this will be an opportunity to learn about this method, how it works, to participate hands-on under the guidance of experts, and to learn about the practical applications of INAA through research projects currently underway at the CNAA. Those with INAA experience will become acquainted with the capabilities and services of the McMaster Nuclear Reactor. Participants will leave at the end of the workshop with a small, functional data set they will have created. Registration is now open! Please go to: http://socserv.mcmaster.ca/dig/index.html. For more information. Deadline for submission is February 27th, 2009. Contact dig@mcmaster.ca for further information regarding session or abstract proposals.

Radiocarbon 2009 Conference, May 31-June 5, 2009, Kona, Hawaii. The abstract deadline is March 15, 2009. Session topics include Eurasian Neolithic archaeology; Pacific Islands archaeology; bone chemistry and related studies; paleoclimate applications; sample preparation; AMS; radiocarbon techniques; and calibration. The conference fee will be $800 if paid before April 20, 2009 and $950 after that date. The conference fee includes an Opening Reception, all meals and breaks (except June 3rd excursion and Thursday evening dinner), Luau & Volcano Excursion and Poster session reception and a copy of the conference proceedings to be published by Radiocarbon. Your registration fee is not considered a donation to the University of Arizona Foundation. Treasury rules permit income tax deductions for educational expenses - registration fee plus travel - to maintain or improve professional skills. Please consult your tax professional on your specific situation. More information is available at the conference web site: http://www.radiocarbon2009.org.

Isotopic and Chemical Tracers in Archaeometry–New Approaches and Applications, Goldschmidt 2009 Conference (www.goldschmidt2009.org), Davos, Switzerland, June 21-26. Convenors: J. E. Spangenberg (Jorge.Spangenberg@unil.ch) and M. Regert (martine.regert@wanadoo.fr). Keynote: Richard Evershed. The focus of the session is described below: Biogeochemistry and isotope geochemistry are fundamental

tools used in the study of changes in past climates, environments and evolution of ancient societies. Recent results have uncovered many new aspects of early socio-economic settings, including food availability, preparation and consumption, procurement strategies, palaeodiet, trading routes and migrations of populations. This session aims to bring together researchers from (organic and inorganic) chemistry, isotope geochemistry and archaeometry in order to describe new developments in the study of materials and artefacts recovered from archeological sites. Emphasis will be given to new analytical techniques and results of multidisciplinary case studies using geochemical, isotopic, mineralogical, botanical, and zoological methods. This session also aims to integrate contributions discussing the processes that affect the composition of archaeological remains and comparisons with modern reference materials. Abstract submission begins on January 1, 2009, and ends on February 22, 2009. All abstract submissions will be online. Accepted abstracts will be published in Geochimica et Cosmochmica Acta. We invite you to participate and submit a presentation to this session. If you require further information on this session, please contact us directly by e-mail.

MAEGS-16 and the Annual Meeting of the Romanian Geological Society. The Association of European Geological Societies (http://www.aegs.org/aegs.html) and the Geological Society of Romania (http://www.geosociety.ro) cordially invite you to join the 16th Meeting of the Association (MAEGS-16) and the Annual Meeting of the Romanian Geological Society which will be held between 9 to 13 July 2009, in Cluj-Napoca, the heart of Transylvania (Romania). The AEGS is an international organisation promoting all fields of geosciences, and is supported by subscriptions from 30 national geological societies from Europe, with the General Assemblage held every two years in one of the subscribing countries. The aim of MAEGS-16 is to bring together geoscientists and the representatives of the society to discuss recent progress and future trends. Thus, the following topics will play a major role: "education in geology" and "geology and cultural heritage." During MAEGS-16, the Percival Allen Medal award will be given to a geoscientist for outstanding achievements in the field of international relations in Earth Science. We whole heartedly look forward to meet you in Cluj-Napoca at MAEGS-16, which will provide you with outstanding scientific information and an opportunity to interact with many colleagues in an excellent environment.

Joint Meeting: 2nd Latin-American Symposium on Physical and Chemical Methods in Archaeology, Art and Cultural Heritage Conservation (LASMAC 2009) and the **Symposium on Archaeological and Arts Issues in Materials Science of the International Material Research Congress** 2009 (IMRC09) to be held in Cancun, Mexico, in August 2009. The objective of this joint symposium is to present and to discuss the most recent and new Latin-American researches for the study of the cultural heritage and the historical past using the most diverse techniques and scientific methodologies, including non destructive methods, nuclear techniques and ion beam accelerators, optical and electronic microscopy, imaging techniques, experimental archaeology, archaeo-magnetism and paleo-magnetism, all kind of chemical methods, dating, deterioration studies and conservation procedures. This forum is open to conservators, physicist, chemists, engineers, archaeologists, art historians and other specialists involved with the scientific study of the cultural heritage and archaeological and historical collections. This meeting will open a space for the collaboration between different groups and specialists, as well for network in the American continent and with European facilities. The LASMAC has been integrated to one of the most Mexican outstanding meetings for materials characterization related to archaeology, history, arts and conservation, the Archaeological and Arts Issues in Materials Science Symposium that has been organized since more than ten years ago as part of the International Materials Research Congress. Besides the Latin-American area, this invitation has been sent to colleagues from Spain and Portugal in order to provide an Ibero-American frame, as well as to the main research groups in other countries of Europe, the USA and Canada working in this kind of studies. The symposium will include invited lectures of 30 minutes as well as oral presentations of 15 min, selected by the Scientific Committee of the Symposium. Several sessions of posters will be organized and the three most relevant works will be awarded. Some courses of 6 hours may be carried out during the first day of the meeting. A special publication with the most outstanding contributions -after a referring process- will be prepared. The papers will be published in a CD with an ISBN and then they will be sent to the symposium participants. Main Topics: Methodologies for the characterization of materials for archaeology, history and cultural heritage using physical and chemical techniques. Studies on ancient technologies and manufacturing of objects and materials. Provenance and sourcing of manufactured and raw materials. Dating techniques and their applications. Deterioration and conservation of materials and collections. Pollution effects on cultural heritage. For more information, see http://www.mrs-mexico.org.mx/webimrc09/documentos/LASMAC_2009_english.pdf.

III International Conference on Remote Sensing in Archaeology, Tiruchirappalli, India, 17-21 August 2009 (http://www.spacetimeplace2009.org). In October 2004, the 1st International Conference on Remote Sensing Archaeology was organized by the Chinese Academy of Sciences in Beijing and hosted by the Joint Laboratory of Remote Sensing Archaeology (JLSRA). In that context an international team of experts was created in order to promote multidisciplinary activities of remote sensing archaeology in the entire world. In December 2006 the second International Conference was held in Rome (Italy) at the National Research Council. The IIIrd International Conference will be organized in India at Tiruchirappalli, jointly by Bharathidasan University, University of California, Merced and Berkeley, University of Siena (Italy) and by the REACH Foundation, Chennai. The conference will discuss a wide range of perspectives, approaches and issues on the use of remote sensing and digital technologies in documenting, analyzing and interpreting archaeological and anthropological contexts. Innovative contribution, case studies, research projects, posters

are invited under the following themes and related topics: Aerial archaeology: satellite, aerial photography and airborne scanning; 3D remote sensing: technologies and archaeological interpretation; Close-range aerial photography: mast, balloon, kite, blimp, UAV, helikite; Ground-based sensing archaeology; Integrated remote sensing technologies for the interpretation of landscape ecosystems: confronting scales of detail; Issue of archaeological interpretation of remote sensing data; Cyber archaeology and 3D landscapes visualization through the time; Issues of quality framework in archaeological remote sensing: defining high standards; Experience of archaeological remote sensing from commercial sector; Special sessions will be addressed to archaeology in the digital age and heritage management; Digital Cultural Atlases (projects and prototypes) and cultural atlas components (gazetteers, time-periods, biography and social networks, thesauri, technical infrastructure, content sources and display models); National and Trans-National Historical GIS; Conservation Issues: methods, environmental issues, causes/remedies, legal status, traditional and international norms, integration; Cultural and natural sites resource management; Sustainability, utility and management of Heritage sites.

Luminescence in Archaeology International Symposia, European Cultural Centre of Delphi, Greece in September 9-12, 2009. The topics range from fundamental studies of the physical basics and mechanisms of luminescence dating, through advances in equipment technology and analytical procedures, to sound applications and studies on archaeological material from various cultures of the World. Comparisons with other dating methods are encouraged. A few invited lectures will provide an overview on the main topics. Both oral and poster contributions will be considered for presentation. Scheduled sessions include: Dating of heated and solar bleached archaeological material (artefacts, sediments, rocks and buildings) and Rock Art, dating in Prehistoric, Classical Antiquity and Medieval Eras, New World Archaeology, Case studies for the World Palaeolithic, Geoarchaeology, New methodological developments, Dosimetry applications, Combined chronological studies (Luminescence, Radiocarbon, Uranium Series, etc), Precision and Accuracy in luminescence, Authenticity Testing, Instrumentations and facilities, Statistics in luminescence, Use of luminescence in archaeological material studies, Innovations and Special Applications. "Nearly 50 years after the publication of the first Thermoluminescence ages, the field of Luminescence Dating has reached a level of maturity, in both research and applications in archaeology and geology." "L.A.I.S. is a new international initiative that mainly focuses on the use of luminescence dating for materials and questions of archaeological significance; in addition supports archaeological and archaeometrical communities of the World to further develop and expose luminescence issues." "LA.I.S. Symposia aim at bringing together experts in the fields of luminescence, archaeology and archaeological materials from all around the world. In an exchange of knowledge, the techniques and tools available in luminescence dating and luminescence applications will be introduced to the archaeologists and archaeological problems will be presented for the scientific community." "L.A.I.S. Symposia initiates a series of conferences planned to take place every two to three years; however, the next two symposia are planned for the consecutive years 2011 and 2013 while an initial planning on the next hosting countries has been made." "The 1st L.A.I.S. Symposium will take place in Greece and symbolically be hosted at the European Cultural Centre of Delphi (www.eccd.gr), Greece in September 9-12, 2009." "The papers and posters presented at these conferences will be published in a special edition of a peer-reviewed international journal related with luminescence." For more information, see http://kalamata.uop.gr/~lais2009/index.htm.

European Meeting on Ancient Ceramics. The UCL Institute of Archaeology and the British Museum are proud to organize the tenth anniversary European Meeting on Ancient Ceramics (EMAC), to be held at the British Museum in London from 10-13 of September, 2009. The main focus of EMAC is the scientific study and archaeological interpretation of ancient ceramics. Bringing together established scholars and young researchers from a wide range of academic backgrounds, including archaeologists, ceramic petrologists, chemists, material scientists, geologists and art historians, EMAC stimulates an international and cross-faculty exchange of ideas and approaches. We are committed to make this EMAC especially inclusive, therefore we particularly solicit contributions from non-European countries, and on non-European ceramics. Several keynote speakers from outside Europe have been invited. London's EMAC '09, coinciding with Wedgwood's 250th anniversary, will have a special themed session "From Craft to Science", to promote and discuss the study of ceramics produced in the wake of the Industrial Revolution. In addition, we are glad to offer a one-day excursion to Stoke-on-Trent on Sunday 13th, to visit the newly refurbished Wedgwood Visitor Centre and Museum. The following themes will be covered as well: Technology and provenance, Methodological developments, Dating, Technical ceramics, Building materials, Islamic ceramics, and Residue analysis. All delegates will receive a copy of the volume that will be published with selected conference papers. For further information, registration and submission of abstracts please visit the following website: www.ucl.ac.uk/EMAC09.

6th International Bone Diagenesis Meeting, September 18-21, 2009, University of Bonn, Germany. The Bone Diagenesis (BD) meeting looks back on a successful history of more than 2 decades. The meeting was originally initiated by Robert Hedges from the Department of Archaeology, University Oxford. The first BD meeting took place in 1988 and about every 4 years thereafter. The scientific results have been published in several special issues of high-ranking international journals from a range of disciplines. The purpose of the BD meeting is to bring together scientists from different disciplines such as archaeology, anthropology, palaeontology, palaeobiology, geochemistry, mineralogy, genetics, forensics, taphonomy and others working on ancient bones and teeth as archives to reconstruct the behavior and life history of vertebrates as well as their environment and

their taphonomy. Fossil bones and teeth yield important information about the phylogeny and evolution of vertebrates as well as the life history of the individual animal or human being. With regard to their chemical composition fossils record information about the growth, diet, thermophysiology and mobility of the individual as well as climate and habitat. Ancient DNA may enable us to infer phylogenetic relations and the geographic origin of species. Such in vivo signals may be altered during the process of fossilization of bones while their histology is often preserved and increasingly used in vertebrate palaeontology. The chemical and mineralogical changes during diagenesis are a valuable source of information in their own right. They enable us to characterize the post mortem history, taphonomy and diagenetic milieu as well as to trace the fossil provenance. For the 6th BD meeting we are looking for scientific contributions dealing with the: (1) Understanding of the post-mortem diagenetic processes and their role in the preservation or destruction of primary information; (2) Development of new proxies and analytical methods to quantify diagenetic alteration and processes; (3) Use of chemical or histological proxies in fossil bones and teeth to infer lifetime or taphonomic processes. The BD meeting will take place from the 18.9.-21.9.2009 just before the annual meeting of the Society of Vertebrate Paleontology in Bristol starting on the 23.9.2009 (thus allowing participants to attend both meetings). Part of the meeting will be a half-day field trip either to the famous Eocene oil shale deposit of the Messel pit or the Neanderthal Museum near Düsseldorf. Additionally we plan a two-day pre-conference fieldtrip to famous palaeontological and archaeological sites in southern Germany such as Holzmaden as well as to palaeolithic sites in caves of the Swabian Alb that yielded the oldest examples of sculptural human art more than 30,000 years old.

International aerial archaeology conference, AARG 2009 SIENA, Certosa di Pontignano, 25 - 27 September 2009, Organized by the University of Siena, Italy, and the Aerial Archaeology Research Group. The following sessions have been proposed for the presentations and discussions on 25 and 26 September. Offers, posters and additional session titles of papers are welcome: Aerial Archaeology in Italy and the central Mediterranean; New Projects; Postgraduate Research; Interpretation, Interpretation, Interpretation…in the 21st century; The Death of Cropmarks?; Engaging with Aerial Photography; Conflict and Military Archaeology; Beyond-Visible Archaeological Reconnaissance. Note: session titles are provisional and all papers and session proposals are welcome. Oral papers should usually be 20 minutes duration. Equal value is given to poster presentations. Closing date for abstracts is 31st May 2009. Address for all conference correspondence: Dave Cowley, RCAHMS, 16 Bernard Terrace, Edinburgh, EH8 9NX, Scotland, Email dave.cowley@rcahms.gov.uk. Aerial Archaeology Research Group website: http://aarg.univie.ac.at.

International Conference on Historic Metals Conservation, Interim Meeting of the ICOM-CC Metal WG, Charleston, South Carolina, USA, 11-15 October 2010. Original Papers Are Invited For Submission Under The Following Themes: Case Studies and Treatments (Technical and authentication studies; Conservation of large artifacts; Conservation of composite artifacts; Mass treatment; Conserving artifacts on a budget) and Research and Treatment Development (Advances in metal analysis and corrosion characterization; Progress in conservation treatments; New approaches in metals protection; Monitoring metal artifacts before and after conservation; Technology transfer from the industry. Authors interested in presenting a paper should submit an extended abstract (400-600 words) before 1 June 2009. The work must be original and not previously published. Contributions should be in English and include the contact information for the author[s] (affiliation, address, telephone, fax, and e-mail). The abstracts should be submitted via e-mail at the following address: ICOMCC.Metal2010@gmail.com. All abstracts will be reviewed by the Program Committee based on three criteria: (1) Originality (2) Quality (3) Contribution to the field of conservation. After abstracts are reviewed and approved, all presenters will be required to submit a complete paper for publication in the Conference Proceedings. For deadlines see: http://www.timetoast.com/timelines/4880.

SAS Business

2009 SAS Annual Business Meeting. The 2009 annual business meeting, open to all SAS members, will be held in conjunction with the annual meetings of the Society for American Archaeology in Atlanta, Georgia. The SAS meeting is scheduled to take place on Friday, April 24, 2009 from 3:30-5:30 PM at the Atlanta Marriott Marquis.

SAS Seeks New President-elect. The Society for Archaeological Sciences announces a call for nominations for President-elect. According to the By-laws of the Society for Archaeological Sciences (http://www.socarchsci.org/docs/SAS_bylaws_March_2005.pdf), the President: (a) shall preside over all meetings of the Executive Board, be the presiding officer of the Society, have the usual appointive power, and shall exercise all the duties and responsibilities commonly associated with this office, except as provided in the Articles of Incorporation and these By-laws; (b) may appoint representatives of the Society to other societies, agencies, or councils or select such representatives from slates submitted by other societies, agencies, or councils; (c) shall recommend to the Executive Board the Editor of the *SAS Bulletin*; (d) shall, with the advice and consent of the Executive Board, appoint all necessary committees and define their duties; (e) may designate members in various regions to represent the interests of the Society in that region; (f) shall sign all written contracts authorized by the Executive Board, except that basic contracts for printing and other matters necessary to publications shall be signed by the General Secretary and the

Editor of the *SAS Bulletin*; and (g) The actions of the President in exercising the duties and responsibilities of the office shall be subject to review and approval of the Executive Board. The President-elect shall serve during the two years prior to the assumption of the duties of president. Under the direction of the Executive Board, he/she shall be responsible for planning the General Meeting of the Society. All nominations (including self nominations) must be delivered in writing to the SAS General Secretary, Robert S. Sternberg, rob.sternberg@fandm.edu. Any current SAS member in good standing is eligible for nomination. The deadline for nominations in March 16, 2009.

***SAS Bulletin* Seeks New Editor**. The Society for Archaeological Sciences is seeking an Editor-in-Chief for its quarterly publication, *SAS Bulletin: Newsletter of the Society for Archaeological Sciences*. For over 30 years, the *SAS Bulletin* has been an integral part of the SAS as a means to share information about the latest research in archaeological science as well as jobs, training, conferences, Society business, and other relevant news. The first Editor in 1977 was R. E. Taylor, who was followed in later years by Suzanne P. De Atley, George "Rip" Rapp Jr., Patrick E. Martin, Robert S. Sternberg, Christopher L. Nagle, Robert H. Tykot, and, since 2005, E. Christian Wells. The Editor is responsible for the *Bulletin's* content and publication schedule. To help in this effort, the Editor is joined by a group of associate editors, each with the responsibility to collect information about a different sector of archaeological science and to share this information with the Editor for publication in the *Bulletin*. The current areas of archaeological science covered in the *Bulletin* include: archaeological ceramics, archaeological chemistry, archaeometallurgy, bioarchaeology, dating, geoarchaeology, and remote sensing and GIS. There are also associate editors for book reviews and the meeting calendar. Copies of previously published issues are available on-line, http://www.socarchsci.org/sasb.htm. The new Editor will mail their first issue (Volume 33, Number 1) to the membership on February 1, 2010. Please send inquiries and proposals to Christian Wells, cwells@cas.usf.edu.

Protecting Mexico's Heritage Using Basic GIS Modeling

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In July 2007, Mexico's President, Felipe Calderón, launched the National Infrastructure Program to provide equal opportunities for all Mexicans, particularly those that have the greatest need; construct and expand the infrastructure required to increase the competitiveness of the Mexican national economy; and turn Mexico into a highly competitive logistic platform that will take advantage of these geographic and commercial advantages. The National Infrastructure Program is one of many development policies that are taking place around the world, propagated by institutions such as the International Monetary Fund and the World Bank, placing societies in an imagined future of well-being, living standards and opportunities for individuals, particularly those living in the Third World. The idea of development connotes an imaginary identity of the Third World with ordered spaces, populated by tall buildings, highways, railways, and ports.

The National Infrastructure Program is an ambitious project including: the construction of almost 20,000 km of highways and rural roads; the expansion of the railway system by almost 1,500 km; the development of suburban railway projects, in particular near Mexico City; the expansions of Pacific and Gulf Coast ports; the construction of at least three new airports and expansion of existing airports. The implementation of the infrastructure growth program will impact Mexico's archaeological resources at various levels. Already, public concern has been growing and pressure is being put on both developers and the government-elected stewards of this patrimony. Mexicans are becoming more aware of the importance and rapid destruction of their cultural heritage and traditions…and they have not been quite about this. A typical example is the public protest that erupted over the destruction of the historic *El Casino de la Selva*, located in the city of Cuernavaca, for the construction of a COSTCO store in 2002. More recently, the construction of the residential towers, Punta Vista Hermosa Altitud in Cuernavaca, by a developer named SARE, was a catalyst for public protest in violation of urban planning laws and the visual impact the buildings created on the landscape. Behind the discontent, Mexican society is revealing the existence of a larger number of cultural values that are relevant to every day life.

Although UNESCO is protecting intangible cultural heritage, it excludes alternative views of what heritage means to society. In this regard, expert knowledge manages conceptions of heritage and heritage by conceptualizing what tradition is, in the midst of resistance. Expert knowledge is not the only mechanism reconfiguring people's values and traditions. Transnational companies such as Coca-Cola are driven forces changing the identity of Mexico's national patrimony into that of a 'world heritage', the new definition of the site of Chichen Itza. Within this setting, transnational companies and the public are key participants in defining archaeological resources for preservation.

Development policies reveal public concern that not enough is being done to protect Mexico's heritage despite that archaeological resources are defined and protected by federal laws, falling under the jurisdiction of the National Institute of Anthropology and History (INAH). However, the laws are not protecting the 20th century built and open spaces that are significant to Mexican people and may not exhibit any aesthetic value. INAH officers have recognized that these laws are

outdated, with the additional issues of lacking human and financial resources to fulfill their federal mandate of protecting Mexico's heritage. As a result, archaeological resources remain in a defenseless state against the intense and rapid economic development of Mexico.

Institutions facing public discontent and unrest are beginning slowly to consider cultural resources as part of their development policies. The recent federal land use plan policy created the perfect scenario to consider cultural resources by the municipal structure of the State of Morelos as part of their environmental impact assessment plans. In response, the municipios of Cuernavaca and Jiutepec signed a cooperative agreement with the University of Morelos that contracted with a private cultural resources firm, Statistical Research Inc., because of its experience in conducting fast-track projects in large spatial areas using techniques such as GIS-based predictive modeling.

Due to the legal framework mandating the land use plans, the established deadlines, and the limited funds assigned to this venture, our goal was to establish some base-line conditions and a process that could be expanded and used to minimize adverse effects on archaeological resources. Computer GIS-based modeling was done to create a model that differentiated areas by their potential for different types of cultural resources, based on an excellent settlement survey done earlier by Timothy S. Hare (2001) in the Yautepec Valley, east of Jiutepec. Definition of cultural resources was based mostly on the literature, given the time constrains. Since environmental assessment plans include public workshops as a main strategy to take people's opinions into account, we used the cultural data obtained from this exercise and incorporated the information in our model (Figure 1).

Figure 1. Archaeological Potential Model showing the probability of finding sites within the Municipio of Jiutepec, characterized by a densely built area. (Illustrations prepared by Statistical Research for the Municipio of Jiutepec)

During the public workshops it became evident that the participants were members of civil organizations following their own political agendas and not exactly representing the views of those living in the city of Cuernavaca. Creating a model based on their knowledge would rule out other opinions, leading to discontent. The solution was to sample survey the whole municipio of Cuernavaca. Given the population size of the city, we interviewed a thousand people distributed along ten ecological zones, each defined into five environmental mapping units. Twenty people were interviewed in each unit to learn their values and knowledge about resources that later were mapped as sensitivities (Figures 2-3). At the end, we created a predictive model for the city of Cuernavaca that incorporated expert and popular knowledge (Figure 4).

The comparative exercise demonstrates that the voices of those participating in public workshops, usually members of civil organizations, differed from average citizens in the community, in their notions of patrimony. In general, the survey showed that 62% of the sampled population considered as very important the safeguarding of cultural resources. The inhabitants of Cuernavaca remarked the importance of safeguarding historic landmarks; avenues; weekly markets; the neighborhoods of Acapatzingo, Gualupita, and Tlaltenango; the festivities dedicated to the Patron Saint in their neighborhood; and recreational spaces such as parks, theaters, and cinemas. Interestingly, the football court was seen as an important cultural resource, as these types of spaces are frameworks for the establishment of social relationships and areas of conflict

Figure 2. Spatial distribution of population sampling along ten ecological zones, each defined into five environmental mapping units. (Illustration courtesy of Valentino Sorani)

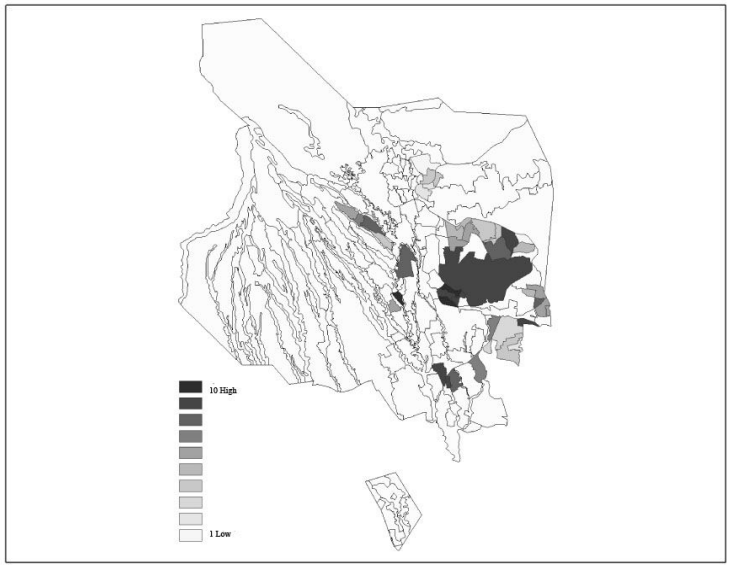

Figure 3. Archaeological Perception Model of the Municipio of Cuernavaca, based on data recovered from sampling. (Illustrations prepared by Statistical Research for the Municipio of Cuernavaca)

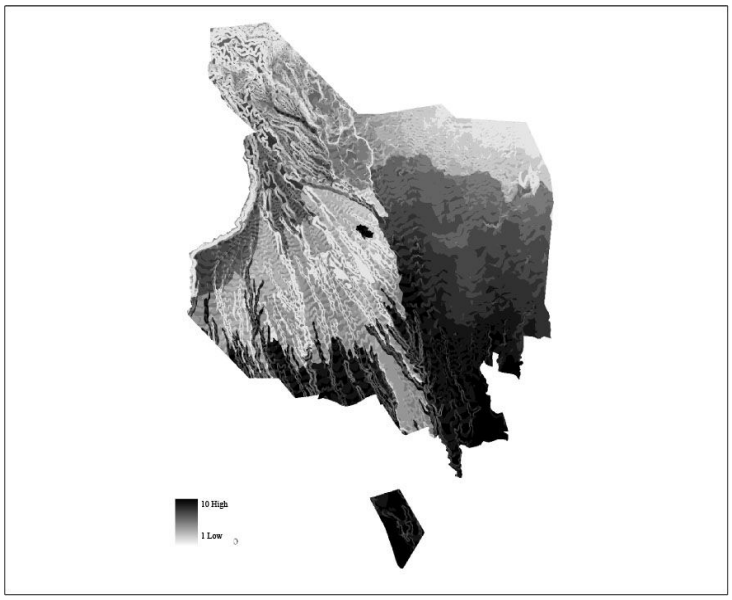

Figure 4. Predictive model for the Municipio of Cuernavaca, showing sensitive areas for finding cultural resources. (Illustrations prepared by Statistical Research for the Municipio of Cuernavaca)

solving. All of these spaces have social significance to the people of Cuernavaca. However, federal laws do not protect these valued spaces and locations of wide-ranging activities. UNESCO's intangible cultural heritage definition excludes these alternative views of what heritage means to society.

While advances in GIS-based predictive modeling have been dramatic over the last decade, none of these high-powered tools were used on this project. The project had a total time line of a few weeks, not the months or years typical of the modeling done, for example, on large tracts of publically-held land in the United States. Additionally, for several reasons, the excellent existing GIS site data layers that are managed by INAH were not available to use on this project. Thus, the traditional modeling approach that correlates known site locations with characteristics of the natural environment to predict unknown site locations could not be used. Instead, we needed a very quick and expedient approach if archaeological resources were to be included in the process at all. While our team certainly had very advanced modeling capabilities, utilizing these methods would not have helped to protect resources at all since the window of opportunity would be missed. Archaeological scientists, while having a robust and powerful suite of methods and tools available, must step back to look at the larger picture and ultimate goals prior to selecting the tools and approach. Sometimes less is more.

Developing land use plans for the two project areas followed similar strategies of producing GIS-based predictive model using relationships established from the data of Hare (2001). Hare had worked just adjacent to our project areas, conducted a settlement survey, and tied site locations to the natural environment. In a sense, our correlative work had already been done, although we lacked the quantitative statistical component that we would have had in a true correlative modeling effort. However, relationships and patterns could clearly be defined. These relationships were imposed on the natural resource data of our project area in a rapid exercise of thresholding and map algebra. The few sites that were known were included in the models, but note that much of the project areas are under urban/suburban infrastructure obscuring most surface indicators. Our resulting models certainly are not statistical, nor can we quantify their predictive power. As planning tools, though, they have tremendous utility to guide development towards areas that are less likely to have archaeological sites. The models are a place to start and can be refined iteratively through use as sites are reported.

The results of these two projects suggest important and changing perspectives on the definition and safeguarding of cultural resources in Mexico. For the first time, two municipios considered cultural and environmental resources in their land use plans. For the first time too, these two municipios received spatial models that could be used proactively as a basis for differentiating areas that were more or less sensitive for different resource types. Authorities valued the contribution of the private sector to meet their demands, as the University of Morelos relied on archaeologists trained to work in the applied sector. In Mexico, archaeology and anthropology students are trained to conduct research, not to undertake part of large fast-track projects requiring large teams of professionals and support services.

Based on our experience in working with planning and development projects for the Morelos government, we suggest that the preservation of Mexico's heritage is dependent of several strategies. One of them is the need to mandate social

assessment studies as part of infrastructure programs, incorporating the preservation of cultural resources. Since INAH has the responsibility for the preservation of Mexico's cultural resources, we suggest as a strategy to separate the *responsibility* of protection from the *work* of protection. INAH can delegate the work required for protection while maintaining the oversight that is required. INAH can, and should, set the standards for work and review all work to ensure it meets all the necessary requirements. We believe that the private sector working together with INAH presents a viable and quickly implementable solution to effectively managing Mexico's cultural patrimony. In countries with active private sectors, this is exactly what happens.

A developer or another government agency wants to construct a road. To obtain permits for construction, they must go through INAH's already defined process. If the resources are unknown for the given area, INAH could mandate an archaeological survey of the area and produce a report for review. In case the report does not fulfill the required standards, INAH will reject it and the permit will not be issued until it is ready. The developer seeking the permit would be able to hire INAH or a qualified archaeology company to do the work, paying a percentage to INAH. To determine who is qualified to carry this investigation, INAH could use international standards set up, for example, by the Register of Professional Archaeologists (RPA), which other countries in Latin America are already taking into consideration. Even though the costs of compliance and the activities of compliance are done outside of INAH, the Institute continues to retain control to fulfill its mandate for patrimony protection.

In most parts of the world, developers are more than willing to pay for cultural resource work. The cost of hiring a private firm that can quickly conduct the required research usually is far less than the cost of project delays or litigation. This "polluter pays" model has been effective in many different countries of the world and currently is used in Mexico both for natural resource and social impact studies. Private-sector preservation is well established in Mexico for natural resources with the project sponsor contracting for compliance services under the oversight of government agencies. While a number of countries in the world have quite developed private-sector industries to protect their patrimony, this model has only recently been introduced to Mexico. The inclusion of the private sector will not threaten INAH's authority or mandate to preserve patrimony—it will simply enhance the institution ability to fulfill its mission on behalf of the people of Mexico. Precisely, the people of Mexico must have a say as to what is important and their voices must be included with those of preservation professionals and government officials who are the stewards of the resources.

Notes

This contribution originates from a paper presented at the 73rd Annual Meeting of the Society for American Archaeology. A version of this paper has been published in Spanish by Sandra L. López Varela and Christopher D. Dore in 2008, in *La arqueología aplicada: una alternativa para la protección del patrimonio ante las políticas de desarrollo nacional. Tributo a Jaime Litvak King,* edited by Paul Schmidt Schoenberg, Edith Ortiz Díaz, and Joel Santos Ramírez, pp. 123-138. Instituto de Investigaciones Antropológicas, UNAM, Mexico.

Archaeometallurgy

Thomas R. Fenn, Guest Associate Editor

The column in this issue includes the following four topics: 1) New Books; 2) New Chapters and Articles; 3) Ph.D. Theses; and 4) Meetings and Conferences.

New Books

The Chrysokamino Metallurgy Workshop and Its Territory, Philip P. Betancourt, with contributions by Eleni A. Armpis ... [*et al*.], Hesperia Supplement 36, The American School of Classical Studies at Athens, Princeton, New Jersey, 2006, xxii + 462 pp., ill., maps; ISBN-10: 0-87661-536-1; ISBN-13: 978-0-87661-536-2, $65.00 (pbk.). Contents: Part I: The Chrysokamino Territory; Ch. 1: Ph. P. Betancourt: Introduction. Ch. 2: Ph. P. Betancourt, W.R. Farrand: The Natural Environment. Part II: The Metallurgy Workshop; Ch. 3: Ph. P. Betancourt, J.D. Muhly, E.A. Armpis, R.S. Powell, E.B. Shank, E. Sikla, T. Yangaki: The Excavation of the Metallurgy Workshop. Ch. 4: Ph. P. Betancourt: The Apsidal Structure. Ch. 5: Ph. P. Betancourt: The Pottery. Ch. 6: D. Evely: The Stone Tools. Ch. 7: Ph. P. Betancourt: The Furnace Chimney Fragments. Ch. 8: Ph. P. Betancourt, J.D. Muhly: The Pot Bellows. Ch. 9: S.C. Ferrence, B. Koukaras: Miscellaneous Ceramic Artifacts. Ch. 10: Ph. P. Betancourt: Other Metallurgical Materials. Ch. 11: D.S. Reese: Faunal Remains. Ch. 12: G. Jones, A. Schofield: Evidence for the Use of Threshing Remains at the Early Minoan Metallurgical Workshop. Ch. 13: J.D. Muhly: Chrysokamino in the History of Early Metallurgy. Ch. 14: Ph. P. Betancourt: Discussion of the Workshop and Reconstruction of the Smelting Practices. Part III: The Surface Survey; Ch. 15: Ph. P. Betancourt: Introduction to the Surface Survey. Ch. 16: L. Onyshkevych, W.B. Hafford: Topography of the Chrysokamino Region. Ch. 17: Ch. R. Floyd, A Summary of the Habitation Site at Chrysokamino-Chomatas. Ch. 18: Ph. P. Betancourt, Ch. R. Floyd: Edith Hall's Excavations in the Theriospelio Cave. Ch. 19: D.C. Haggis, Chrysokamino in Context: A Regional Archaeological Survey. Ch. 20: Ph. P. Betancourt: The geographic Boundaries of the Chrysokamino Farmstead Territory. Ch. 21: Ph. P. Betancourt: Land Use on the Chrysokamino Farmstead. Ch. 22: Ph. P. Betancourt: Survey Conclusions. Appendixes; App. A: G.H. Myer, Ph. P.

Betancourt: Petrography and X-Ray Diffraction Analysis of Slags and Furnace Chimneys. App. B: Y. Bassiakos: SEM/EDAX Analysis. App. C: Z. Stos, N. Gale: Lead Isotope and Chemical Analysis of Slags from Chrysokamino. App. D: S.C. Ferrence, Ch. P. Swann: Arsenic Content of Copper Prills: A Study Applying PIXE. App. E: Ch. M. Thompson: Slag Analysis by Wavelength Dispersive Spectrometry. App. F: Y. Bassiakos, M. Catapotis: Reconstruction of the Copper Smelting Process at the Chrysokamino Bases on the Analysis of Ore and Slag Samples. App. G: Ph. P. Betancourt, L. Onyshkevych, W.B. Hafford: Register of Anthropogenic Features.

Tell el-Dab'a XV: Metalwork and Metalworking Evidence of the Late Middle Kingdom and the Second Intermediate Period, by Graham Philip, Austrian Academy of Sciences, 2006, 252p., illus.; ISBN-13: 9783700136644, $197.50 (pbk.). The contents includes the following chapters and appendices: "Introduction" (Graham Philip), "Catalogue of Metal Artefacts" (Graham Philip), "Typology, Chronology and Comparative Analysis" (Graham Philip), "Metallurgy At Tell El-Dab'a" (M.J. Cowell, Graham Philip), "Archaeological Context" (Graham Philip), "A Consideration Of The Implications Of The Metalwork From Tell El-Dab'a" (Graham Philip), "Appendix 1 Tell El-Dab'a Metalwork Listed By Context", and "Appendix 2 Concordance Of Excavation Registration Numbers And Sequential Catalogue Numbers". The collection of metal artefacts from Tell el-Dab'a of the eastern Nile Delta, dating to the first half of the 2nd millennium BC, is probably the richest, best-documented find of the eastern Mediterranean that has been published to date. The material will provide new insights into various dimensions of past societies of this region. A brief introduction to the site begins the volume, followed by a fully illustrated catalogue of the findings – an extensive range of copper-alloy artefacts and smaller numbers of silver and gold objects. Next, the various artefact classes are discussed in terms of their wider typological parallels, chronology and distribution, thus permitting the material from the Delta to be viewed in terms of the wider Egyptian and Levantine equivalents. From this comparison it is clear that the bulk of the material is of west Asian inspiration, derived from styles first seen in north-west Syria in the last centuries of the 3rd millennium BC. The extensive range of metalworking debris from the site, including limestone and steatite moulds, crucibles, copper ingots and tuyeres, is treated in detail, and the relationship between the artefacts for which there is evidence of on-site production and the finds in general is discussed. The volume also reports on the chemical analysis of a wide range of copper and silver artefacts from the site, and considers the correlation, in some cases surprising, between composition and typology. Contextual analysis of grave findings clarifies links between artefact types and the age and sex of the buried individuals, sets of artefacts, and patterns in the positioning of artefacts within graves; changes through time can also be seen. Thus it is possible to investigate the similarities and contrasts between burial practices in Tell el-Dab'a and contemporary practices in the Levant and the Nile Valley. Despite the "hybrid" material culture of the Delta society, it is argued that mortuary practices, at least for the elite, drew heavily on aspects of west Asian ideology. This leads to a discussion of the connection between the symbolic role of metalwork and the expression of status, and a consideration of the possible social and political implications of changing stylistic zones within the east Mediterranean basin during the earlier 2nd millennium BC. Also reviewed is the manner in which specific elements of material culture were influenced by the development and flourishing of a distinctive Nile Delta elite identity.

The Archaeometallurgy of Copper: Evidence from Faynan, Jordan, by Andreas Hauptmann, Natural Science in Archaeology 1, Springer, 2007, xii, 388 p., 170 illus., 24 in color; ISBN-13: 978-3-540-72237-3, $139.00 (hbk.). The book deals with the ancient exploitation and production of copper, exemplified by the mining district of Faynan, Jordan. It is an interdisciplinary study that comprises (mining-) archaeological and scientific aspects. The development of organizational patterns and technological improvements of mining and smelting through the ages (5th millennium BC to Roman Byzantine period), in a specific mining region, is discussed. Principles of modern archaeometallurgy in the field and laboratory are explained. An important focus is on mineralogical and chemical slag investigations and on the role of trace elements and lead isotope abundance ratios in ores and metals. Provenance studies show the distribution of Faynan copper in the Southern Levant in the Early Bronze Age. Chapters are organized as follows: 1) Introduction; 2) Problems and Methods of Archaeometallurgy; 3) Nature and Geology in Faynan; 4) The Raw Material Sources; 5) Field Evidence and Dating of Early Mining and Smelting in the Faynan District; 6) Study of Archaeometallurgical Slag and Metal; 7) Copper Smelting Technology; 8) Export of Ore and Copper: the Importance of Faynan in Prehistoric Palestine; and, 9) Summary. The book concludes with a comprehensive bibliography, technical appendices and an index.

The Derveni Krater: Masterpiece of Classical Greek Metalwork, by Beryl Barr-Sharrar, Ancient Art and Architecture in Context 1, The American School of Classical Studies at Athens, Princeton, NJ, October 2007, 208 pp., 47 col and 167 b/w figs, 1 map; ISBN-13: 978-0-87661-962-9, $75.00 (hbk.). This beautifully illustrated book represents the first full publication of the most elaborate metal vessel from the ancient world yet discovered. Found in an undisturbed Macedonian tomb of the late 4th century B.C., the volute krater is a *tour de force* of highly sophisticated methods of bronze working. An unusual program of iconography informs every area of the vessel. The krater is placed in its Macedonian archaeological and art historical context. While primarily an art historical work, there is some important discussion on the bronze working methods.

Science and Civilisation in China, Volume 5, Chemistry and Chemical Technology, Part 11: Ferrous Metallurgy, by Donald B. Wagner, Cambridge University Press, 2008; 536p., 114 line figures 73 halftones 4 tables ; 246 x 189 mm.; ISBN-13: 9780521875660, $220 (hbk.). The contents consist of: 1. Introduction; 2. Introductory orientations: the traditional Chinese

iron industry in recent centuries; 3. The earliest use of iron in China; 4. The flourishing iron industry of the -3rd and -2nd centuries; 5. The Han state monopoly of the iron industry; 6. The arts of the smith from Late Han through Tang; 7. Technical evolution and economic revolution in the Song period; 8. Economic expansion in the Ming period; 9. Some Chinese contributions to modern siderurgical technology; and, 10. Epilogue. This is a revised and updated version of Joseph Needham's original volume of the same name. Donald B. Wagner provides a comprehensive historical account of the production and use of iron and steel in China in their political and economic context. An initial chapter on the traditional Chinese iron industry introduces the important technical concepts and the ways in which technology, geography, and economics interact and influence political phenomena. Recent archaeological work indicates that the earliest production of iron in China was in the Northwest, and that the technology was introduced from the West via Central Asia. It was, however, the invention in South China of large-scale technologies which put China on a very different developmental path from that of the West. Further chapters deal with developments from the Han to the Tang, the technical evolution and economic revolution of the Song period, and economic expansion under the Ming. A final chapter investigates the debt of the modern steel industry to Chinese developments. This publication offers the most comprehensive historical account of the development of ferrous metallurgy in China from the beginning, ca. 1000 BC, to modern times, and provides full analysis of the economic aspects of the topic.

Metals and Mines: Studies in Archaeometallurgy, edited by Susan La Niece, Duncan Hook and Paul Craddock, Archetype Publications in association with the British Museum, London, UK, December 2007, 98 color, 85 half-tones; ISBN-13: 978-1904982-19-7, £45.00 / $90.00 (hbk.). This publication is the product of selected papers from the conference "Metallurgy: A Touchstone for Cross-Cultural Interaction" held at the British Museum 28–30 April 2005 to celebrate the career of Paul Craddock during his 40 years at the British Museum. Following a Preface and Acknowledgements by Susan La Niece and Duncan Hook, papers are organized into four main thematic sections, and the volume is concluded with an index. The main sections of the volume comprise Mining and Smelting; Copper, Tin and Bronze; Brass and Zinc; and, Iron and Steel. Contributions to the first section are "Chalcolithic copper smelting" (David Bourgarit), "Zambujal and the beginnings of metallurgy in southern Portugal" (Roland Müller, Gert Goldenberg, Martin Bartelheim, Michael Kunst and Ernst Pernicka), "The use of experimental archaeology/ archaeometallurgy for the understanding and reconstruction of Early Bronze Age mining and smelting technologies" (Simon Timberlake), "On the edge of success: the scientific examination of the products of the Early Mines Research Group smelting experiments" (Paul Craddock, Nigel Meeks and Simon Timberlake), "Towards a functional and typological classification of crucibles" (Justine Bayley and Thilo Rehren), and "Records of palaeo-pollution from mining and metallurgy as recorded by three ombrotrophic peat bogs in Wales, UK" (T.M. Mighall, Simon Timberlake, S. Singh and M. Bateman). The Copper, Tin and Bronze section consists of "Prehistoric copper production at Timna: thermoluminescence (TL) dating and evidence from the East" (Andreas Hauptmann and Irmtrud Wagner), "On the origins of metallurgy in prehistoric Southeast Asia: the view from Thailand" (Vincent C. Pigott and Roberto Ciarla), "Coals to Newcastle, copper to Magan? Isotopic analyses and the Persian Gulf metals trade" (Lloyd Weeks), "The first use of metal on Minoan Crete" (J.D. Muhly), "Cross-cultural Minoan networks and the development of metallurgy in Bronze Age Crete" (Noel H. Gale and Zofia Anna Stos-Gale), and "One hundred years on: what do we know about tin and bronze production in southern Africa?" (Shadreck Chirikure, Simon Hall and Duncan Miller). The third section, Brass and Zinc, a subject we know is dear to Paul Craddock, comprises "Of brass and bronze in prehistoric Southwest Asia" (Christopher P. Thornton), "Brasses in the early metallurgy of the Iberian peninsula" (Ignacio Montero-Ruiz and Alicia Perea), "The beginning of the use of brass in Europe with particular reference to the southeastern Alpine region" (J. Isteniè and Z. Šmit), "Roman brass and lead ingots from the western Mediterranean" (Gerd Weisgerber with contributions by Paul Craddock and Nigel Meeks, U. Baumer and J. Koller), "Copper-based metal in the Inland Niger delta: metal and technology at the time of the Empire of Mali Laurence" (Garenne-Marot and Benoît Mille), "Preliminary multidisciplinary study of the Miaobeihou zinc-smelting ruins at Yangliusi village, Fengdu county, Chongqing" (Liu Haiwang, Chen Jianli, Bao Wenbo, Wu Xiaohong, Li Yanxiang, Han Rubin, Sun Shuyun and Yuan Dongshan), and "The origin and invention of zinc-smelting technology in China" (Zhou Weirong). The final section on Iron and Steel includes "Slags and the city: early iron production at Tell Hammeh, Jordan and Tell Beth-Shemesh, Israel" (Harald Alexander Veldhuijzen and Thilo Rehren), "Innovations in bloomery smelting in Iron Age and Romano-British England" (Sarah Paynter), "Decisions set in slag: the human factor in African iron smelting" (Thilo Rehren, Michael Charlton, Shadreck Chirikure, Jane Humphris, Akin Ige and Xander Veldhuijzen), "The anatomy of a furnace ... and some of its ramifications" (Peter Crew and Michael Charlton), "Early Chinese ferrous swords from the British Museum collections" (M.L. Wayman and C. Michaelson), and "Crucible steel in medieval swords" (Alan Williams).

New Chapters and Articles

Some new contributions to archaeometallurgy come as chapters in another exciting new publication, *From Mine to Microscope: Advances in the Study of Ancient Technology*, edited by Andrew Shortland, Ian C. Freestone and Thilo Rehren, Oxbow Books, Oxford, UK, December 2007, 384p.; ISBN-10: 184217259X , ISBN-13: 9781842172599, $120.00 (hbk.). The primary subject matter of the volume is ancient vitreous materials with an emphasis on glasses and glazes, but there also are a few archaeometallurgical contributions. These include "New Thoughts on Niello" (Peter Northover and Susan La Niece), "What A Long, Strange Trip It's Been: Lead Isotopes and Archaeology" (A. M. Pollard), "From Mine to Microbe -

the Neolithic Copper Melting Crucibles from Switzerland" (Thilo Rehren), and "Across the wine dark seas... Sailor tinkers and royal cargoes in the Late Bronze Age Eastern Mediterranean" (Zofia Anna Stos).

From the new volume *Euphrates River Valley Settlement: The Carchemish Sector in the Third Millennium BC*, edited by Edgar Peltenburg, Levant Supplementary Series 5, Oxbow Books, Oxford, UK, October 2007, 256p., ISBN-13: 9781842172728, $120.00 (hbk.), come two relevant contributions. In section "Part 3: Carchemish Sector Material Culture in its Broader Context" are "The metalwork of the Carchemish region and the development of grave repertories during the third millennium BC" by Graham Philip, and "Regional culture and metal objects in the area of Carchemish during the Early Bronze Age" by Filomena Fausta Squadrone.

From *Levant* 38 (2006) comes the contribution "Brass chains from a public building in the area of the bathhouse at Tiberias" by A. Lester and Y. Hirschfeld (pp. 145-158), and "'Coinage before coins?': A further response to Raz Kletter" by M. Silver (pp. 187-189).

From *Historical Archaeology* 2007, 41(2):84-157, comes "A Dictionary of Blacksmithing Terms", an important new contribution from John D. Light, who has worked documenting historic blacksmithing traditions and technology for more then two decades. The contribution consists of a 9 page article, with references, and a 63 page dictionary with illustrations accompanying some of the definitions.

From the *Proceedings of the National Academy of Sciences of the United States of America* come a "Four-thousand-year-old gold artifacts from the Lake Titicaca basin, southern Peru", by Mark Aldenderfer *et al*. (2008, 105, 13:5002-5005), and "The strange case of the earliest silver extraction by European colonists in the New World", by Alyson Thibodeau *et al*. (2007, 104, 9: 3663-3666).

Ph.D. Theses

Inter-Regional Interaction and Urbanism in the Ancient Indus Valley: A Geologic Provenience Study of Harappa's Rock and Mineral Assemblage, by Randall William Law, II, at the University of Wisconsin, Madison, U.S.A. This is a large and comprehensive compilation of various stone and mineral resources exploited at Harappa, and the potential sources for those raw materials. Of particular interest is "Chapter 12: Lead, silver and copper acquisition networks" (pp. 619-708), which provides a nicely researched chapter on the potential sources for those three metals at Harappa. Included in the discussion of this chapter is a section on lead isotope analyses of samples from Harappa and from potential sources. A total of eight appendices are included with previously published and new lead isotope analysis data.

The winds of change: an archaeometallurgical study of silver production in the Porco-Potosi region, southern Bolivia (AD 1500-2000), by Claire Cohen, University College London, Institute of Archaeology, 2008. This thesis considers the technology employed to produce silver within the Porco-Potosí region, southern Bolivia, providing archaeo-metallurgical data on indigenous and European silver production methods in Porco during the period AD 1500 to 2000. The research has been conducted as part of Proyecto Arqueológico Porco-Potosí (PAPP) directed by Dr Mary Van Buren (Colorado State University). The region of Porco was home to an Inca mine already prior to the Spanish conquest in 1538. Few years later, Spanish rule was established at Potosí. Indigenous technology, such as wind blown furnaces, huayrachinas, continued to be used in the region, until the introduction of mercury amalgamation from 1571 onwards meant that the indigenous methods of silver production were superseded. *Huayrachina* technology employed at Porco dates back to at least the mid 16th century, with historical indications for earlier usage. PAPP has documented ongoing *huayrachina* smelting near Porco as late as 2003, showing the continuing existence of this technology. In this thesis, different silver production techniques from the archaeological and ethnographic records have been assessed using analytical techniques: Energy Dispersive X-Ray Fluorescence, Optical Microscopy and Scanning Electron Microscopy, and including a historical, archaeological and theoretical review of the relevant data. In Porco, a diverse range of metallurgical techniques was being used for both small and large scale production. From the early colonial periods onwards both European and indigenous methods were used simultaneously to produce silver. The Spanish influence is evident in the archaeological remains of European furnaces. The analyses of the European furnaces show that these were more efficient in extracting metal than the indigenous *huayrachinas,* at the expense of increased fuel consumption. A comparison between the archaeological and recent *huayrachina* remains has shown differences in smelting capacity; the latter having a relatively low metal yield and reduced technical efficiency, and indicating a change in ore composition. Recent silver production shows an environmental adaptation taking into account the difficulty and cost in obtaining fuel and ore. The continued use of the *huayrachina* over five centuries shows the persistence of indigenous technology, despite other production methods being available. The results of this project contribute to a better understanding of the history of the Porco-Potosí region, and to Andean metallurgy.

Meetings and Conferences

An international "Workshop on Early Iranian Metallurgy" was held in the Dept. of Archaeology at The University of Nottingham from September 19-21, 2007. A group of 15 scholars from Iran, Italy, Germany, France, the USA and the UK met to discuss recent developments in our understanding of early metallurgy in Iran. The program focused upon the earliest periods of metallurgy in the region, from the Neolithic period through to the later 3rd millennium BC, and included presentations on material from across Iran, on early copper production and extraction, on the prehistoric copper-tin mines of the Zagros, and on the prehistoric smelting of lead and

cupellation of silver. The final morning of the workshop was devoted to discussion of issues in the interpretation of early metal technologies in the region (particularly the production of arsenical copper) and to the ways in which the research of the various individuals and institutions represented at the workshop might be integrated in the future to advance the study of early metallurgy in the region. Presentations included "Archaeometallurgical researches in central Iran" (Ernst Pernicka), "Deh Hosein ancient Sn-Cu mine: a major source of tin in the ancient world" (Nima Nezafati), "On the origin of lost-wax casting and alloying in the Indo-Iranian world" (Benoît Mille), "Mineralogical and geochemical investigations into prehistoric smelting slags from Tepe Sialk, Central Iran" (Marcus Schreiner), "From crucibles to furnaces: New insights into early metallurgy of Iran on the basis of the joint Iranian-German excavations at Arisman" (Barbara Helwig), "The early metallurgy of northeastern Iran: Tepe Hissar" (Chris Thornton), "Metallurgy at Shahr-i Sokta" (Claudio Giardino), "Earliest metallurgy of southeastern Iran: Iblis and Yahya" (Chris Thornton), "Metallurgy at Shahdad: Copper-base needles and pins" (David Meier), "The earliest metal artefacts from highland SW Iran: fabrication, composition, and exchange" (Lloyd Weeks), Banech period metallurgy at Tal-e Malyan, Fars" (Vincent Pigott), "Metallurgical activity at Godin Tepe, Iran: production, consumption, and trade" (Lesley Frame), and "The first metallic items at Susa, periods of Susa I, and comparisons" (Agnès Benoit). The program can be downloaded (as PDF) at: http://www.nottingham.ac.uk/archaeology/research/reports/iran_metals_workshop_programme.pdf.

"Cultural Developments and Technological Innovations in 1st Millennium BC/AD, West Africa", held March 12-14, 2008, in Ouagadougou, Burkina Faso, included several papers on copper and ion metallurgy. These comprised: "Kissi, Copper and trans-Saharan Commerce: Archaeometallurgical analyses of copper-based objects from Kissi, NE Burkina Faso" (Thomas Fenn, D. Killick, S. Magnavita, J.T. Chesley and J. Ruiz), "Relire les données analytiques et archéologiques concernant les bijoux en métal base cuivre des sépultures de la période du Fer I de Grébenart : révision des conclusions sur la contemporanéité des sites du Fer I et du Cuivre II (Aïr, Niger) et apports de nouveaux éléments à la connaissance des contacts transsahariens" (Laurence Garenne-Marot), "La sidérurgie dans le Sahel burkinabé à la fin du Ier millénaire" (Jean-Marc Fabre), "Métallurgie ancienne du fer dans le Gulmu : évolution des techniques de production entre le premier millénaire après J.C et l'occupation des Gulmanceba" (Lisa Thiombiano), "La métallurgie ancienne du fer en Côte d'Ivoire : Etat des recherches et perspectives à venir" (Timpoko Helene Kienon-Kabore), "Very Early Iron Smelting in the Bassar Region of Northern Togo at Dekpassanware" (Philip de Barros), "L'exploitation traditionnelle du fer et la fondation du royaume de Wogdogo (Ouagadougou, Burkina Faso) " (Lassina Simporé), "La diffusion de la métallurgie de fer en Afrique de l'ouest au cours du *premier millénaire après JC. Evidences archéologiques, analogies ethnographiques et interprétations concernant la diffusion des innovations*" (Hans Peter Hahn).

The 73rd Annual Meeting of the Society for American Archaeology, held March 26-30, 2008, in Vancouver, British Columbia, Canada, included a surprising number of individual papers and several sessions on ancient and historic metals and metallurgical ores. The dedicated sessions included two Electronic Symposia, a presentation format seeing more popularity these days, as well as a Working Group session. The electronic symposia format typically consists of having electronic versions of the papers submitted in advance of the symposium, and then the symposium session time is dedicated to discussion of the papers and research themes and problems. The individual papers were scattered through a number of non-metallurgical thematic sessions. The electronic symposia comprised "Modelling Early Metallurgy: Old and New World Perspectives", http://www.saa.org/meetings/esymposium/96/index.html, and "The minds behind the metal: accessing past metallurgical experience", and the working group was "Current Archaeometallurgical Research in Mesoamerica: New Approaches, Discoveries and Perspectives". The former symposium consisted of fourteen papers (eleven of which can be downloaded as PDFs from the SAA website link above), and a discussant. Paper titles and authors in this symposium were "Copper Working Technologies, Contexts of Use, and Social Complexity in the Eastern Woodlands of Native North America" (Kathy Ehrhardt), "Recent Developments in Mesoamerican Metallurgy" (Dorothy Hosler and Johan Garcia), "A Multi-Craft Perspective on the Production, Use and Significance of Metals in the Middle Sicán Culture of Peru" (Izumi Shamada), "Cultural Transmission and Technological Choice: the early development of metal in Western Europe" (Ben Roberts), "Early West African Metallurgies: Glosses, Facts, and Fictions" (Augustin Holl), "Adoption of metallurgy in eastern and southern Africa" (David Killick), "Who Dunnit? The development of 'second-generation' metal technology in the southern Levant" (Jonathan Golden), "The Domestication of Metals in Bronze Age Alalakh" (Aslihan Yener), "The Emergence of Complex Metallurgy on the Iranian Plateau: Escaping the Levantine Paradigm" (Christopher Thornton), "Copper-based Metals in the Indus Economy" (Brett Hoffman and Heather Miller), "Early Metal in South India: Copper and Iron in Megalithic Contexts" (Praveena Gullapalli), "Southeast Asian Early Bronze Metallurgy: A Complex Technological System in a Heterarchical Social Context" (Joyce White and Elizabeth Hamilton), "Beginnings of Metallurgy in Ancient East Asia: Who, When, and Where?" (Katheryn Linduff), "From Scale to Practice – A New Agenda for the Study of Early Metallurgy on the Eurasian Steppe" (Bryan Hanks), and discussant Vincent Pigott. The second electronic symposium consisted of nine papers and a discussant. The paper titles and authors in this symposium were "The Origins of Metallurgy in Europe – Evidence for Early Copper Smelting in Belovode, a Vinca Culture Site in Eastern Siberia" (Miljana Radiviojeviæ, Ernst Pernicka, Dusan Sljivar and Thilo Rehren), "Pre-Tiwanaku Silver-Lead Cupellation in the Lake Titicaca Basin, Peru" (Carol Schultze, Charles Stanish, David Scott), "The Ancient Metallurgy during the Early Bronze Age in the Southern Part of the Caucasus: Recent Results form Excavations and Survey in Western Azerbaijan" (Antoine Courcier), "Exploring the

Possibility for the Use of Wind Power for Copper Smelting in Mesoamerica" (Blanca Maldonado), "Non-Destructive Analyses of the Pewter Hoard from Cheapside, London" (Chris Lagen), "Applying Ethnographic Presents to Archaeological Pasts: Memories of Iron Production in Western Uganda" (Louise Iles), "Iron Producers of Precolonial Southern Rwanda" (Jane Humphris), "Concepts of Value and Quality in Early European Ironworking" (Evelyne Godfrey), "Innovation in Late Medieval Iron Production" (Michael Charlton), and discussant Robert Tykot. The working group session, organized by Scott Simmons and Aaron Shugar, focused on discussion of Mesoamerican archaeometallurgical research issues and included discussants Scott Simmons, Blanca Maldonado, Laura Richardson, Niklas Schulze, Elizabeth Paris, and Hans Roskamp. Relevant presentations from other sessions can be generally grouped as New World and Old World papers. The New World papers included: "Contextualizing Copper-Working at the Moorehead Phase Mound 34 Cahokia" (Jon Kelly, James Brown and Lucretia Kelly), "The Source of Hopewell Extraterrestrial Metal and Its Anthropological Implications" (Amy Marquardt, Timothy McCoy, Edward Vicenzi and Richard Ash), "Non-Destructive Study of Metallic Artifacts from the Chichen-Itza Cenote" (Jose Luis Ruvalcaba, Jannen Contreras and Jesus Arenas), "The cultural agony of technological choice: The copper bells of the Templo Mayor of Tenochtitlan (Mexico)" (Niklass Schulze), "Cinnabar Distribution in Ancient Mesoamerica: Archaeological Sites and Geological Sources" (Brian McKee), "Hematite Mining in the Ancient Andes: Mina Primavera, A 2000 Year Old Peruvian Mine" (Kevin Vaughn, Jelmer Eerkens and Moises Linares), "XRF analysis of contact-era copper artifacts from the Meier and Cathlapotle sites, Lower Columbia River" (Kenneth Ames and Loren Davis), "Neutron Activation Analysis (NAA) of Iron Oxide Artifacts from St. Charles and St. Louis Counties, Missouri" (Rachel Popelka-Filcoff, Patti Wright, Michael Glascock and J. David Robertson), "Ochre Procurement and Distribution on the Central Coast of British Columbia" (Brandi Lee MacDonald, R.G.V. Hancock, Alice E. Pidruczny and Aubrey Cannon), "Metals, Pigments, Ores and Assays: The Politics of Value in the Early Spanish Colony of New Mexico" (Noah Thomas), The Persistence of the Huayras in Southern Bolivia: A Case for Evolution or Immobility?" (Claire Cohen, Thilo Rehren and Mary Van Buren), and "Technological persistence and Change in Postclassic Period Maya Metallurgy" (Scott Simmons). A few miscellaneous Old World papers on ancient metals and metallurgy also were presented, including: "Metallurgical Provenance Study: Transition from Bronze Age to Iron Age in Northern Europe" (Kelly Wilhelm), "Silver Jewelry as Money in the Iron Age Near East" (Virginia Rimmer), and "Small Change in Madagascar: Sacred Coins and Profaned Coinage" (Susan Kus and Victor Raharijaona).

The 37th International Symposium on Archaeometry was held from May 12-16, 2008, in Sienna, Italy. As is typical with this conference, many paper were given on topics involving methodologies, technologies and analyses pertaining to ancient and historic ceramics, glasses, glazes and other vitreous materials, all with relevance to pyrotechnology. However, Friday, May 16, included a session dedicated to Metals and Metallurgical Ceramics (Technology and Provenance) (Convenor: Thilo Rehren). Papers from this session were: "Introduction to the session" (Rehren, Th.), "The beginnings of metal production in southwest Iberia" (Müller, R., Mataloto, R., Calado, M., Pernicka, E.), "Bowls and plates: Final Neolithic and Early Bronze Age silver production in south-eastern Attica through a study of litharge fragments" (Georgakopoulou, M., Kakavogianni, O., Douni, K., Bassiakos, Y.), "Copper production in the Khao Wong Prachan Valley of prehistoric central Thailand: Defining technological style in the laboratory and in the field" (Pryce, T. O., Pigott, V., Martinón-Torres, M., Rehren, Th.), "Teasing apart the interplay of recycling, alloying, smithing and trade in Early Bronze Age British and Irish metallurgy: what can patterns in copper alloy composition reveal beyond provenance?" (Bray, P. J.), "Lorenzo Ghiberti's Porta del Paradiso: understanding the crafting processes" (Siano, S., Miccio, M., Ferretti, M., Pacini, A., Mugnaini, S., Garagnani, G.), "Function precedes matter: The adaptation of technical ceramics to their functionality" (Hein, A., Kilikoglou, V.), "The regional variability of the chemical composition of iron smelting slags in the Dogon Country (Mali, Africa, 15th –19th AD)" (Serneels, V., Katona, I., Robion-Brunner, C., Perret, S.), "Slag inclusion, smelting site exclusion? The provenancing to different production site origins of early first millennium BC iron artefacts from the Near East through the analysis of slag inclusions" (Veldhuijzen, H.A., Blakelock, E.), "New insights on the diffusion of smelting processes and the supply of construction iron through the study of slag inclusions" (L'Heritier, M., Dillmann, P., Desaulty, A.-M., Leroy, S., Gratuze, B.), "Tin smelting in southern Africa: a preliminary reconstruction of the process" (Chirikure, S., Heimann, R., Killick, D.), "Coin or jewel? Gold supplies of Late Antiquity in Gaul" (Guerra, M.F., Stutz, F.), "Arabic coins as a silver source for Slavonic and Scandinavian jewellers in the 10th century AD" (Eniosova, N.V., Mitoyan, R.), "ICP-MS with a laser ablation for a better understanding of the trading role of early Venice in Carolingian time" (Sarah, G., Bompaire, M.), "Laboratory and industry: a comparison between small- and large-scale productions of noble metals in sixteenth-century Europe" (Mongiatti, A., Rehren, Th., Martinón-Torres, M.), "Secretly seeking silver: the strange case of the Kapfenberg laboratory (Austria)" (Martinón-Torres, M., Mongiatti, A., Rehren, Th., Friedl, K., Von Osten, S.). Another paper in a different session, "Beyond the enclosure: geophysics and the investigation of metal production and community organisation in the Middle Bronze Age of the Southern Ural Steppe" (Merrony, C.J.N., Hanks, B., Zdanovich, D., Epimakhov, A.), also pertained to archaeometallurgy.

The International Conference AMiTEM 2008: "Ancient Mining In Turkey and the Eastern Mediterranean", was held from June 15-22, 2008, in Ankara, Turkey. The conference aimed at gathering and sharing information on all aspects of ancient mining and metallurgy in Turkey and the Eastern Mediterranean including the Aegean, Cyprus, Caucasian countries (Georgia, Armenia, Azerbaijan), Iran, Syria, Lebanon, Israel, Jordan, Iraq, Egypt, Yemen, Oman, Saudi Arabia, and the Persian Gulf countries. Paper presentations ran from the

morning of Sunday, June 15 to the afternoon of Tuesday, June 17, while the remaining five days of the conference were a Conference Study Tour including visits to archaeological sites, obsidian sources, the Kestel-Goltepe tin mine and Cappadocia. The introductory session of the conference included two archaeometallurgy papers: "The Beginning and Development of Metallurgy in Anatolia", Ü. Yalçin, and "Beginning of Archaeometallurgical Research in Turkey: A Personal Retrospect", H.G. Bachmann. In the afternoon papers in the session "*Anatolia: Mining and the Use of Raw materials: Metal*" included "Metals in Hittite Records", J. Souckova-Siegelova, "Metal Technologies during the Late Chalcolithic and Early Bronze Age in North Central Anatolia: Ikiztepe a case study", H. Özbal, N. Pehlivan, M. Adriaens, B.G. Uluocak, and B. Earl, "Revisiting Kestel Mine and Göltepe: the Dynamics of Local Provisioning of Tin during the Early Bronze Age", K.A. Yener, "Three Best to Have in Plenty – Rethinking Central Anatolian Early Bronze Age Alloying Traditions", T. Zimmermann and T. Yildirim, "Metal Objects from Karaz, Pulur and Guzelova Excavations: General Observations about Ancient Mining and Metallurgy in Northeastern Anatolia", M. Iikli, and "On the Pactolus Alluvial Gold of Sardis, Turkey", A.E. Geçkinli. On Monday papers continued with "Wooden Miners Shovels from the Ancient Underground Mines in Anatolia", E. Kaptan, "The Technology and Metal Analyses of Camalti Burnu I Shipwreck Iron Anchors", U. Kocabai, "Technological and Archaeometallurgical Studies on the Urartian Swords and Daggers", H. Biber, V. Sevin, and Ü. Yalçin. Another session on Tuesday, "*Neighbours of Anatolia: Mining and the Use of Raw materials: Metal and Non-Metal*", included the papers "Archaeometallurgical Surveys in the Eastern Rhodopes in the Period of 2004-2006, Results and Perspectives for Development", A. Jockenhövel, and H. Popov, "The Earliest Gold Mining of the Ancient World?", T. Stöllner, I. Gambaschidze, and A. Hauptmann, "A Study of Mining Methods and Ventilation during the Egyptian Period at the Mines of Timna", C.T. Shaw and S. Durucan, "Wind-powered Copper Smelting Technology from the 3rd Millennium BC at Feinan/Jordan", W.G.J. Bunk, A. Hauptmann, S. Kolschbach and G. Woelk, "The Iron Ore Mine of Mugharet el-Wardeh/Jordan in Southren Bilad el-Sham – Excavations and new dating", Y. Alamri, and A. Hauptmann. Finally on Tuesday, the paper presentations concluded with "New Insights into the Ancient Mining and Metallurgical Researches in Iran", N. Nezafati, and M. Momenzadeh, "Evidence on the Ancient Mining and Metallurgy at Tappeh Sialk, Central Iran", N. Nezafati, E. Pernicka, and S.M. Shahmirzadi, "Comparative Profitability Analysis on Polymetallic Ore Sources with Respect to Archaeometallurgical Melting Process in Lasoleyman Area Closed by Meymand Cave Dwelling Village in Kerman, Central Iran", S.M. Emami and O. Oudbashi, and "Nubias A-Group and its Copper Artefacts", A. Schlickmann. There also was a Monday session, "*Anatolia: Mining and the Use of Raw materials: Non-Metal*", on mining and research on nonmetallic minerals, stones and materials, including papers dealing with obsidian, salt, bitumen, alabaster and marble. [Apologies for any misspelling of names due to character recognition issues with the program file.] The presented papers have been published as proceedings of the conference entitled, *Ancient Mining in Turkey and the Eastern Mediterranean*, ü. Yalçýn, H. Özbal, and A. G. Paþamehmetoðlu (Eds.), 2008. Atilim University, Ankara, Turkey. ISBN 978-975-6707-20-3, which was given to participants at the registration.

The 19th Biennial Meeting of the Society of Africanist Archaeologists, "Cultural Diversity of Africa's Past", was held from September 8-11, 2008, in Frankfurt, Germany. A number of archaeometallurgy papers were presented in two sections of a large session, "African Metal Working: Organization of Production and Diffusion Patterns (Metal, Objects, Knowledge)", organized by Caroline Robion-Brunner and Sébastien Perret. Papers in the session covered sub-Saharan contexts in Africa and included presentations on both ferrous and non-ferrous metallurgy. One of the plenary papers "Metals in African history and prehistory: a synthesis and some new directions" was given by David Killick and summarized what we know and where we need to be going. Papers organized into the main metallurgy session included "Exploitation minière du cuivre dans la région de Nioro-du-Sahel (Mali actuel) à l'époque des empires médiévaux subsahariens" Sylvain Badey, "The development of an indigenous tin and bronze industry in southern Africa during the second millennium CE" David Killick, Lisa Molofsky, Simon Hall, Shadreck Chirikure, Robert Heimann, John Chesley, Joaquin Ruiz & Dana Drake Rosenstein, "Technology and trans-Saharan commerce: medieval metals trade in the middle Sahel zone, sub-Saharan West Africa", Thomas R. Fenn, Abdoulaye Maga, Oumarou Idé, David Killick, John Chesley & Joaquin Ruiz, "The iron industries of Bunyoro-Kitara: recent archaeometallurgical research in western Uganda", Louise Iles, "Traditional iron working in parts of the 'Nok Culture' area: notes and posers from preliminary investigations", James Ameje, "New dates for iron smelting in Lejja, Nigeria", Pamela Eze-Uzomaka, "Rwanda made iron — iron made Rwanda? The role of iron in pre-colonial Rwanda", Jane Humphris, "Iron production in southern Cameroon: new evidence in comparative perspective", Silja V. Meyer & Manfred K.H. Eggert, and "An iron smelting observed near Molkwo (eastern piedmont of the Mandara Mountains, northern Cameroon) in the late 1980s: from the building to the use of the furnace", Olivier Langlois & Otto Thierry. On the second day of the organized session, papers included "Ricardo and von Liebig in the Mandara Mountains: iron, comparative advantage, and specialization", Nicholas David, "Traversing the liminal: versatility and variability in African iron smelting practices", Shadreck Chirikure, "Your belly is my smithy — cooperative field research to fathom African metallurgy of the recent past", Eileen Kose & Marc Seifert, "The Jèmè-irin, an example of the development of blacksmith clan (Dogon area, Mali): social status and iron working", Caroline Robion-Brunner, "La transmission des savoirs et savoir-faire de la sidérurgie directe en Afrique Occidentale: le cas des métallurgistes du Bwamu (Burkina Faso, Mali)", Elisée Coulibaly, "The socio-economic organisation of the iron production: examples from the Dogon area (Mali)", Sébastien Perret, "A social analysis of metal distribution in the Shashi-Limpopo Valley, CE 900–1300—a preliminary report",

Charlize C.L. Tomaselli, "A reconsideration of lexically based assumptions on the early diffusion of metal working in Central Africa", Anneleen van der Veken & Koen Bostoen, and "New archaeological insights into the Early Islamic trans-Saharan gold trade: gold coin moulds from the West African Sahel (Essouk-Tadmekka archaeological site, Republic of Mali)", Sam R. Nixon.

The Internationales Symposium "Anatolian Metal V": Frühe Rohstoffgewinnung in Anatolien und seinen Nachbarländern [International Symposium "Anatolian Metal V" : Early Raw Material Mining in Anatolia and its Neighboring Countries], will be held November 13-15, 2008, at the Deutsches Bergbau-Museum, Bochum Germany. The conference also is dedicated to Robert Maddin in celebration of his 90th birthday, and will include an introductory paper by Dr. Maddin. Other thematic sessions include "Anatolia and its neighbors, culture story and economy story", "Trade with raw materials, technology transfer and culture transfer" and "New research results to mining and metallurgy." A symposium program can be found at the following website link, but is mostly in German and a few submissions in English: http://www.bergbaumuseum.de/pdf/Anatolian_Metal_V_Programm.pdf.

The World of Iron Conference 2009 (WIC) will be held from February 16-20, 2009, in London, United Kingdom, http://www.ironsmelting.net/WIC2009. The 'World of Iron' conference sets out to explore and celebrate the anthropological significance of the inception, adoption, expansion, and impact of prehistoric iron production outside Europe. Interlacing regional and themed sessions, it will relate archaeological and archaeometallurgical studies to wider anthropological issues such as technological style; technological variation, change and development; technical and social adaptation; and the evolving influences of iron on society and the physical environment. This five day event is the first attempt to synthesize the latest research being conducted on iron and steel around the world, and to stimulate future research of the highest level. It creates a globally comparative perspective, integrating insights gained from established and emerging analytical techniques, Anthropology of Technology, and environmental history, highlighting nuances often obscured by Eurocentric perspectives. By bringing together established scholars and young researchers from four key regions, namely Africa, East Asia, the Indian Subcontinent, and Western and Central Asia, it stimulates an international exchange of ideas and experiences. The Regional Sessions bring together scholars and research from four key regions around the world (Africa, East Asia, Indian Subcontinent, Western and Central Asia), and discuss the latest anthropological, archaeological and metallurgical research in the context of region-specific and wider anthropological themes and considerations. The Themed Sessions incorporate the latest research being carried out in all regions, including Europe, on theoretical, technological, and environmental topics, to ensure maximum coverage of all major anthropological considerations concerning the study of iron production. Themes include Invention, Innovation and Inspiration, Theoretical Approaches to Technology, Scientific Approaches to Technology, and Analytical and Environmental Considerations.

Historical Metallurgy Society Spring Meeting 2009: Urban Archaeometallurgy: Historical Metallurgy in Towns and Cities, will be held February 21, 2009, at the Institute of Archaeology, University College London. A great number of archaeometallurgical remains are found in urban contexts. These include, among others, foundry remains, forges, goldsmith workshops, mints, assay offices or just stray finds of crucibles, slag or metal objects. Although these assemblages are increasingly studied by specialists, many remain unidentified or neglected in archaeological archives. Urban metallurgists used skills and techniques quite different from those used by miners and smelters, and played an important technological and economic role in urban life. Their endeavours were closely related to those of other crafts, and their products were directly relevant to those living in the immediate vicinity. Thus, the documentation and study of urban metallurgical workshops and artefacts provides an interesting path to the functioning of historical towns and cities, as well as insights into relatively unexplored areas of historical metallurgy. This workshop aims to provide a forum for the presentation of studies on metallurgical remains excavated in urban contexts. To provide a balance for the focus on ferrous metallurgy of previous HMS workshops, we particularly encourage presentations of research on non-ferrous and noble metals, and we welcome studies of both metalworking debris and finished artefacts. The chronological and geographical remit is purposefully broad, but we hope to showcase studies of materials recovered during rescue excavations in historical cities. The underlying intention is to provide examples of the use of such assemblages for research purposes, maximising their informative potential and saving them from neglect. By inviting urban archaeologists and finds specialists as well as archaeometallurgists, we also intend to create a network for the development of future projects. If you would like to present a paper, please send a 200-250 word abstract to Marcos Martinon-Torres: m.martinon-torres@ucl.ac.uk. Hopefully the event will be free and open to all, but please send Marcos expressions of interest in attending so that he can estimate numbers.

The 17th International Bronze Congress, "Bronzes: New Finds, New Approaches," to be held from May 24-28, 2009, in Athens, Greece, is sponsored by the American School of Classical Studies at Athens, the Center for the Ancient Mediterranean of Columbia University, and the University of Athens. http://www.bronzecongress2009.org/ The International Bronze Congress is recognized as the leading forum for scholars whose research enhances our knowledge of the art, culture, and technology of bronzes in the classical world. Since 1970, there have been 16 successful Congresses attracting hundreds of participants from Europe, the United States, and Asia. The Athens program will include four days of papers, followed by a three-day optional trip to sites associated with the production and display of ancient bronzes. The call for papers is scheduled for fall of 2008, with acceptances announced in January of 2009.

A Symposium on Archaeometallurgy is being organized for the International Metallographic Society (IMS) and Microscopy & Microanalysis (M&M) joint IMS/M&M Annual Meeting, from July 26-30, 2009, in Richmond, Virginia. The usual Microscopy & Microanalysis format, that requires prospective authors to submit a 2 page extended abstract paper, uploaded into the M&M web site by mid-February (usually February 15) of next year, will be used. As in the past, the organizers are open to a wide range of topics regarding characterization of objects of any type, and by any technique (some microscopy work is desirable, of course). The organizers would appreciate it if you can inform them in the very near future if you are interested. If this is not your area of expertise, but you know of others with such an interest, would you please forward the information to them? Please provide George F. Vander Voort with names and addresses of prospective speakers, who will contacted them if you do not have enough time to do so. Contact: George F. Vander Voort, Phone:1-847-295-4590, George.VanderVoort@buehler.com.

Archaeological Ceramics

Charles C. Kolb, Associate Editor

The column in this issue includes six topics: 1) Four Announcements; 2) Reviews of Books on Archaeological Ceramics; 3) Previous Meetings; 4) Forthcoming Meetings; 5) New Journal; and 6) Exhibition.

Four Announcements

The editors of *La Tinaja: Newsletter of Archaeological Ceramics*, George Bey III and Michael Galaty (Millsaps College) have passed the editorial torch to Christopher A. Pool (Associate Professor and Chair, Department of Anthropology, University of Kentucky, Lexington, KY 40506) and his students at the University of Kentucky. Chris expresses his thanks to George and Mike for the great job they've done at Millsaps for the last eight years. Chris writes that: "I plan to get the first issue under new management out before Christmas. We have two reports already promised for that issue, but there is room for another short report, and of course we have another issue to fill in the spring. So I want to invite submissions from all of you, especially those who participate in the Ceramic Ecology Symposium at the AAAs…" He also sends a call for subscription renewals; the subscription rate is still a great deal at $10 a year. Please send checks to La Tinaja, Department of Anthropology, University of Kentucky, Lexington, KY 40506-0024. Please make checks out to *La Tinaja – U.K.* Guidelines for Submissions to La Tinaja: Submissions to *La Tinaja* may be of several forms: a research report, item for discussion or debate, including announcements, book review, or news from and announcements of upcoming meetings of interest to ceramic specialists. Submissions must follow the American Anthropological Association (AAA) guidelines: http://www.aaanet.org/aa/index/htm ; those that do not will be returned for revision. All submissions should be sent as email attachments (Microsoft Word is preferred) to capool0@uky.edu. Research reports should not exceed 1,500 words and may include a limited number of figures and tables. These should also be submitted electronically, if possible. Book reviews should be less than 1,000 words.

Roxanna M. Brown's Dissertation: *The Ming Gap and Shipwreck Ceramics in Southeast Asia: Towards a Chronology of Thai Trade Ware*. The following is an update on efforts by Roxanna's friends and colleagues to have her dissertation published. Karl E. Weber reports that "good progress" has been made. Volunteer editorial work by Eileen Deeley, Beatrix Latham and Weber has been complemented by generous donations exclusively towards the production of the book which has a total production cost estimated at Baht 750K. On 30 October 2008, the draft final was handed over to the publisher for lay-outing and printing and the proofs were checked in November. The book launch is envisaged near the end of 2008, or early 2009, coupled with an exhibition of shipwreck ceramics and a guest lecture by an expert. The Table of Contents appears below. Information about the publication and availability of the volume will be posted in this column; otherwise Karl is the contact person: Dr. Karl E. Weber, 49 Soi 52 Sukhumwit Road, Bangkok 10260, Thailand; email banbueng@loxinfo.co.th or prospace@inet.co.th ; telephones: + 66 - [0] 2 - 311.35.05 / ~ 332.85.19 or mobile + 66 - [0] 81 - 838.05.89; and fax + 66 - [0] 2 - 742.87.66. *The Ming Gap and Shipwreck Ceramics in Southeast Asia: Towards a Chronology of Thai Trade Ware* by Roxanna Maude Brown. Table of Contents: Impressum (complete with listing of donors); Foreword by the President, The Siam Society Under Royal Patronage; Preface by Professor Robert L. Brown, UCLA; Acknowledgements by Roxanna Maude Brown; Eulogy; Editors' Notes; Map, List of Plates, and List of Tables. The text: Emerging Evidence of Submerged Treasures; Evolution of the Term "Ming Gap"; Shipwreck Excavations: Data Base, Methodology in Outline, and Focus on the 15th Century; Chronology of Thai Trade Ware; Summary; Outlook: The Prospect for the Future; Ceramics Provenance and Categories: An Inventory linked to Plates 1-73 (with 295 photographic reproductions in colour + 8 drawings), Tables 1 – 30 (the database [devised by RMB] which is the framework for the chronology), and Bibliography. Vitae: Roxanna Maude Brown; Publications by Roxanna Maude Brown, 1973-2008; Epilogue by Roxanna Maude Brown (quotes verbatim) and by Jaime Taweesin Ngerntongdee (Roxanna's son). Index.

Mainland Southeast Asian Ceramic Catalogue: In mid-December 2008, the Freer Gallery of Art and Arthur M. Sackler Gallery launched the long awaited the first online catalogue of the museum's collection featuring Mainland Southeast Asian ceramics: http://SEAsianCeramics.asia.si.edu. Spanning 4,000 years, the museum's collection highlights historical ceramics made in or traded to Vietnam, Cambodia, Laos, Thailand and Burma. The catalogue includes multiple color images and

detailed texts, a library of commissioned essays and translations, a bibliography of more than 1,300 citations and an introduction to ceramic sherds housed in the Freer Gallery Study Collection. The essays include: "Ceramic Kiln Lineages in Mainland Southeast Asia" (38 pp.) by Don Hein, "Introduction to Jars in the Life of Ethnic Groups in the Central Highlands of Vietnam" (11 pp.) by Luu Hung, and "Ceramic Kiln Sites in the Songkhram River Basin" (13 pp.) by Walailak Songsiri. There are four bibliographies: historical ceramics of South East Asia, analysis of ceramic materials, kiln site excavations, and scientific dating of kiln sites and objects. An interactive component invites commentary from archaeologists, curators and collectors worldwide. The online catalogue will expand to include all 900 ceramics in the Freer and Sackler collections as well as new discoveries, essays and commentaries. Unlike a printed book with a single linear order of information, the online catalogue allows Web users worldwide to learn about earthenware and stoneware vessels through the triple vantage points of materials, place of production and time. Nearly 800 of the ceramics featured in the online catalogue are from the Hauge Collection in the Sackler Gallery. The collection was donated to the Sackler between 1996 and 2005 by brothers Osborne and Victor Hauge and their wives Gratia and Takako. Osborne and Gratia Hauge first collected ceramics in the late 1960s and early 1970s while living in Bangkok, Thailand, and Saigon (Ho Chi Minh City), Vietnam. During these years they were visited by Victor and Takako Hauge. In the late 1940s, Victor began collecting Japanese ceramics made in the "folk craft" style, or *mingei*. In 1978-79, Victor and Takako prepared the exhibition and book *Folk Traditions in Japanese Art*, organized and circulated by the International Exhibitions Foundation in cooperation with The Japan Foundation. Their awareness and appreciation for unglazed stoneware vessels within the Japanese tea ceremony prepared them to respond with spontaneous sympathy to similar vessels in Thailand and Vietnam. The online catalogue also features ceramics from the Freer Gallery collection of Southeast Asian ceramics. That collection includes three pieces acquired by founder Charles Lang Freer (1854-1919) during the first two decades of the 20th century as Japanese tea ceremony utensils. Only in recent years have they been re-identified as imports from Southeast Asia to Japan. This collection has grown to include more than 100 pieces through generous gifts by Dean Frasché, Dorothy Slak and other donors, as well as through purchases. Entries and information for the online catalogue were written and compiled by Louise Cort (Curator of Ceramics at the Freer and Sackler Galleries) with assistance from George Asheley Williams IV (research assistant at the Freer and Sackler Galleries), and David P. Rehfuss (a volunteer at the galleries and president of the Washington Oriental Ceramic Group). The Arthur M. Sackler Gallery, located at 1050 Independence Avenue SW, and the adjacent Freer Gallery of Art, located at 12th Street and Independence Avenue SW, are on the National Mall in Washington, DC. Hours are 10 a.m. to 5:30 p.m. every day, except Dec. 25, and admission is free.

Archaeological Computing, 2nd ed. by Harrison Eiteljorg, II, with GIS chapter by W. Fredrick Limp. The second edition contains an entirely new chapter concerning the digitizing of information either from on-going projects moving into the digital era for the first time or from completed projects with paper-based records. A "distressing number" of typos and other small errors (Eiteljorg's own comment) have been fixed, and a variety of similar small changes were made. In the chapter on database management systems there were some errors in SELECT statements that have also been fixed. To access the new edition, please visit http://archcomp.csanet.org. The first edition was reviewed in *SAS Bulletin* 30(3):28-29 (Fall 2007).

Book Reviews

Three Books on Archaeological Chemistry: This comparative review provides basic information on three volumes on archaeological chemistry that have been published during the past 18 months. I shall also characterize the contents of each volume and comment on some similarities and differences. Most importantly, for readers of this column, I shall consider how each book treats the topic of archaeological ceramics. The three works are: *A. M. Pollard, C. M. Batt,* B. Stern*, and S. M. M. Young's Analytical Chemistry in Archaeology*, 2007; *A*. M. Pollard *and C. Heron's Archaeological Chemistry*, 2nd ed., 2008; and Zvi Goffer's *Archaeological Chemistry*, 2nd ed., 2007. While seeming similar in content, the focus of each volume is quite distinct. Two are new editions of highly regarded texts, one is a collaborative effort of three authors, another has two writers, and the third was prepared by a single author – a rarity in this day and age of scientific specialization.

A. M. Pollard, C. M. Batt, B. Stern*, and S. M. M. Young, Analytical Chemistry in Archaeology*, Cambridge Manuals in Archaeology, Cambridge and New York: Cambridge University Press, 2007. viii + 404 pp., 93 figs. 13 tables, 10 appendices, references, index. ISBN-13: 9780521655729, $45.00 (paperback), ISBN-13: 9780521652094, $95.00 (hardcover). The content of this volume is divided into three major sections with 13 chapters; there are a total of 748 references. The authors are Mark Pollard, (Edward Hall Professor of Archaeological Science, Research Laboratory for Archaeology and the History of Art, Oxford University, Oxford, UK), Catherine M. Batt and Ben Stern (both in the Department of Archaeological Sciences, University of Bradford, Bradford, UK), and Suzanne M. M. Young (NASA Researcher, Department of Chemistry, Tufts University, Medford, MA). The rapid development of archaeological science has witnessed the transference of scientific analysis to processing its information. The authors explain the basic concepts of chemistry and physics behind analytical techniques and review each in the context of their application to archaeology. They also explain basic terminology, outline the procedures to be followed in order to produce "good data" and describe the function of the basic instrumentation required to conduct those procedures.

The volume is organized as follows: "Part I: The Role of Analytical Chemistry in Archaeology" (pp. 1-43) comprising

"Chapter 1: Archaeology and Analytical Chemistry" (pp. 3-30) and "Chapter 2: An Introduction to Analytical Chemistry (pp. 31-43)." "Part II: The Application of Analytical Chemistry to Archaeology" (pp. 45-214) has seven chapters: "Chapter 3: Elemental Analysis by Absorption and Emission Spectroscopies in the Visible and Ultraviolet" (pp. 47-69, 5 figs.); "Chapter 4: Molecular Analysis by Absorption and Raman Spectroscopy" (pp. 70-92, 9 figs.); "Chapter 5: X-ray Techniques and Electron Beam Microanalysis" (pp. 93-122, 8 figs.); "Chapter 6: Neutron Activation Analysis" (pp. 123- 136, 1 fig.), "Chapter 7: Chromatography" (pp. 137-159, 12 figs., 2 tables); "Chapter 8: Mass Spectrometry (pp.160-194, 11 figs., 2 tables); and "Chapter 9: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)" (pp. 195-214, 9 figs., 1 table). "Part III: Some Basic Chemistry for Archaeologists" (pp. 215-321) has three chapters: "Chapter 10: Atoms, Isotopes, Electron Orbitals, and the Periodic Table" (pp. 217-248, 6 figs., 1 table); "Chapter 11: Valency, Bonding, and Molecules" (pp. 249-274, 22 figs., 3 tables); "Chapter 12: The Electromagnetic Spectrum" (pp. 275-294, 8 figs., 2 tables); and "Chapter 13: Practical Issues in Analytical Chemistry" (pp. 294-321, 2 figs., 2 tables). The remaining parts of the book include "Epilogue" (pp. 322-325), "Appendices" (pp. 326-349), "References" (pp. 350-390), and "Index" (pp. 391-404). The ten appendices are: Appendix I: Scientific Notation (p. 326), Appendix II: Significant Figures (p. 327), Appendix III: Seven Basic SI Units (p. 328), Appendix IV: Physical Constants (p. 329), Appendix V: Greek Notation (p. 330), Appendix VI: Chemical Symbols and Isotopes of the Elements (pp. 331-334), Appendix VII: Electronic Configuration of the Elements (to radon, Z = 86) (pp. 335-336), Appendix VIII: Some Common Inorganic and Organic Sample Preparation Methods Used in Archaeology (pp. 337-339), Appendix IX: General Safe Practice in the Laboratory (pp. 340-341), and Appendix X: COSHH Assessments pp. 342-349).

A. Mark Pollard and Carl Heron, Archaeological Chemistry, 2nd ed., Cambridge, UK: RSC Publishing (The Royal Society of Chemistry), 2008. xvii + 438 pp., 93 figures, 25 tables, 32 molecular structure, 5 appendices, subject index. ISBN: 0854042628, ISBN-13: 9780854042623, $89.95 (hardcover). The book has 22 chapters, each with its own references (a total of 936). The authors are Mark Pollard (Research Laboratory for Archaeology and the History of Art, Oxford University, Oxford, UK) and Carl Heron (University of Bradford, Bradford, UK). This second edition of this popular and acclaimed work builds on the successful formula used in creating the first edition (Pollard and Heron, *Archaeological Chemistry*, RSC Paperbacks, Cambridge, UK: The Royal Society of Chemistry, 1996). The existing case studies have been expanded to take account of new perspectives and new data in the intervening decade since the first edition was published. The new chapters emphasize the increase in molecular and isotopic analysis of organic remains, stable isotopes and molecules and milk (the latter includes references to the recent literature about ancient human diets). In *Archaeological Chemistry* 2nd ed., Pollard and Heron seek to demonstrate the importance and utility of scientific techniques applied to the study of the past. The role of chemistry is emphasized through a series of case studies. The authors' stated goal is to present the scientific investigation as a challenging field of enquiry rather than a routine application of established procedures. Following a brief description of the goals and history of archaeological science and the place of chemistry within it, details the most widely used analytical techniques in archaeology and compares them in light of relevant applications in obsidian, ceramics, glass, metals, and resins. The volume also has reference appendices on basic chemistry and the authors comment on the future role for chemical and biochemical applications in archaeology. This volume was designed as a text for students in archaeological science and chemistry, and professionals in archaeology.

The contents are: "Chapter 1: The Development of Archaeological Chemistry: (pp. 1-18, 79 references), "Chapter 2: Analytical Techniques Applied to Archaeology" (pp. 19-74, 18 figs., 92 references); "Chapter 3: Obsidian Characterization in the Eastern Mediterranean" (pp. 75-97, 4 figs., 72 references); "Chapter 4: The Geochemistry of Clays and the Provenance of Ceramics" (pp. 98-143, 15 figs, 2 tables, 72 references); "Chapter 5: The Chemistry and Corrosion of Archaeological Glass' (pp. 144-192, 11 figs., 4 tables, 104 references); "Chapter 6: The Chemical Study of Metals - the European Medieval and Later Brass Industry" (pp. 193-234, 9 figs., 6 tables, 72 references); "Chapter 7: The Chemistry and Use of Resinous Substances" (pp. 235-269, 3 figures, 32 molecular structures, 132 references); "Chapter 8: Amino Acid Stereochemistry and the First Americans" (pp. 270-301, 6 figs., 6 tables, 70 references); "Chapter 9: Lead Isotope Geochemistry and the Trade in Metals" (pp. 302-345, 13 figs., 1 table, 78 references); "Chapter 10: The Chemistry of Human Bone: Diet, Nutrition, Status and Mobility" (pp. 346-382, 6 figures, 1 table, 95 references); "Chapter 11: The Detection of Small Biomolecules: Dairy Products in the Archaeological Record" (pp. 383-405, 6 figs., 4 tables, 58 references); and "Chapter 12: Whither Archaeological Chemistry?" (pp. 406-412, 14 references). There are five appendices: Appendix 1: The Structure of the Atom, and the Electromagnetic Spectrum (pp. 413-419, 2 figs., 1 table); Appendix 2: Isotopes (pp. 420-423); Appendix 3: Fundamental Constants (p. 424); Appendix 4: Atomic Number and Approximate Weights (based on 12C = 12.000) of the Elements (pp. 425-427); and Appendix 5: Periodic Table of the Elements (p. 428), plus a "Subject Index" (pp. 429-438).

Zvi Goffer, *Archaeological Chemistry*, 2nd ed., Hoboken, NJ: Wiley-Interscience, a John Wiley & Sons, Inc. Publication; Volume 170 in Chemical Analysis: A Series of Monographs in Analytical Chemistry and Its Applications, xxii + 623 pp., 87 figures, 94 tables, 75 textboxes, 3 appendices, glossary, bibliography, index. ISBN 0471252883 and 9780471252887, $116.95 (hardcover). The volume has 17 chapters and a bibliography of 1,516 references; the textboxes are similar to sidebars. Goffer received his B.Sc. and doctoral degrees from the University of London and is now a research scientist retired from the Soreq Nuclear Research Center, Israel. He lectured on archaeometry at Tel Aviv and Beer Sheba universities and

at the Weizmann Institute of Science in Israel, and was a visiting scientist with the scientific archaeology groups at Tokyo National University of Fine Arts, Harvard University, and the Weizmann Institute of Science. The initial edition of his book was published in 1980 as *Archaeological Chemistry: A Sourcebook on the Applications of Chemistry to Archaeology* (New York: Wiley, xv + 376 pp., cloth). This second edition of *Archaeological Chemistry* concerns the application of the chemical sciences to the study of ancient man and his material activities. The narrative on the use of chemical methods but also refers to the contributions of physics, biology, and genetics to archaeological research. The major subjects discussed in the book include the determination of the nature of ancient materials, their provenance and age, the technologies used for the production of man-made materials, and the analysis of ancient human and animal remains (such as bone, dried blood, and coprolites), which yields information on ancient diets, kinship, habitancy, and migratory patterns. New developments in analytical chemistry and related disciplines, which have contributed to archaeological research since the first edition of the book was published, are documented in this new edition, which also includes: updated information on the study of the nature, age, and provenance of ancient materials and new sections on organic, biological and genetic studies. The publisher states that the volume is intended primarily for archaeologists, physical anthropologists and students of archaeology and physical anthropology, but is also be of use to conservators, curators, and art historians. Natural scientists who read it would be informed about advances in archaeological research which were made possible by the application of chemical, physical, and biological methods and techniques.

The 18 chapters are: "Chapter 1: Minerals: Rock and Stone: Pigments, Abrasives, and Gemstones" (pp. 1-91, 17 figs., 22 tables, 23 textboxes); "Chapter 2: Lithics: Flint and Obsidian' (pp. 93-110, 8 figs., 2 tables, 3 textboxes); "Chapter 3: Sand: Glass, Glaze, Enamel" (pp. 111-137, 5 figs., 7 tables, 4 textboxes); "Chapter 4: Secondary Rocks: Building Stone, Brick, Cement, and Mortar" (pp. 138-152, 2 figs., 5 textboxes); "Chapter 5: Ores: Metals and Alloys" (pp. 153-208, 9 figs., 11 tables, 9 textboxes); "Chapter 6: Sediments and Soils" (pp. 79-101, 6 figs., 6 tables, 4 textboxes); "Chapter 7: Clay: Pottery and Other Ceramic Materials" (pp. 231-260, 9 figs., 7 tables, 1 textbox); "Chapter 8: The Biosphere: Organic and Biological Substances" (pp. 261-287, 7 figs., 6 tables, 3 textboxes); "Chapter 9: Carbohydrates: Wood, Gums, and Resins" (pp. 289-309, 3 figs., 8 tables, 4 textboxes); "Chapter 10. Lipids: Oils, Fats and Waxes" (pp. 311-319, 1 fig., 5 tables, 2 textboxes); "Chapter 11: Proteins: Skin and Hide, Leather, Glue" (pp. 321-341, 4 figs., 4 tables, 5 textboxes); "Chapter 12: The Nucleic Acids: Human Traits; Genetics and Evolution" (pp. 343-352, 3 figs., 1 table, 3 textboxes); "Chapter 13: Fibers: Yarn, Textiles and Cordage; Writing Materials (pp. 353-364, 5 tables, 1 textbox); "Chapter 14: Dyes and Dyeing" (pp. 365-378, 1 fig., 5 tables); "Chapter 15: Bioinorganic Materials; Bone, Ivory, Shell, Phytoliths" (pp. 379-392, 3 figs., 2 tables, 1 textbox); "Chapter 16: Some Ancient Remains: Mummies, Fossils, and Coprolites" (pp. 393-404, 2 figs., 2 textboxes); "Chapter 17: The Environment and the Decay of Archaeological Materials" (pp. 405-432, 5 figs., 3 tables, 6 textboxes); and "Chapter 18: The Authentication of Antiquities" (pp. 433-444). There are three appendices: Appendix I: The Chemical Elements (pp. 445-448, 1 fig.); Appendix II: Chronometric Dating Methods: Selection Criteria (pp. 449-451, 1 fig.); and Appendix III: Symbols, Constants, Units and Equivalencies (pp. 453-454). Lastly there is a lengthy "Glossary" (pp. 455-527), "Bibliography" (pp. 529-602), and "Index" (pp. 603-623).

These three volumes are designed as potential textbooks and also serve as significant reference works on the subject of archaeological chemistry. The Pollard, Batt, Stern, and Young volume (2007) provides a broad perspective of the basic concepts and analytical techniques that may be employed, emphasizing spectroscopies, X-ray, and neutron activation analysis, while Pollard and Heron (2008) provide less depth on each of these but add optical analysis to the methods. Goffer (2007) covers some spectroscopic and X-ray procedures in a perfunctory manner. For thin-section studies, see Reedy, *Thin-Section Petrography of Stone and Ceramic Cultural Materials* (2008).

Pollard et al. (2007) devote a chapter to elemental analysis by absorption and emission spectroscopies in the visible and ultraviolet (pp. 47-69) and detail optical emission spectroscopy (OES) atomic absorption spectroscopy (AAS), inductively coupled plasma atomic emission spectroscopy (ICP-AES), and compare analysis by these absorption/emission techniques. Another full chapter concerns molecular analysis by absorption and Raman spectroscopy (pp. 70-92), focusing on optical and UV spectrophotometry, infrared absorption spectroscopy and Raman spectroscopy. Another chapter documents X-ray Techniques and electron beam microanalysis (pp. 93-122), notably X-ray fluorescence (XRF) spectrometry, X-ray diffraction, and other related techniques. Entire chapters are devoted to NAA (pp.123-136), chromatography (pp.137-159), mass spectrometry (pp.160-194), and inductively coupled plasma-mass spectrometry (ICP-MS) (pp.195-214).

Pollard and Heron (2008) briefly cover much of the same material in a general manner, mostly in **"**Chapter 2: Analytical Techniques Applied to Archaeology" (pp. 19-74), but the techniques are also mentioned in some of the case studies (pp. 207-209, 271, 312, 324-325). Goffer (2007) mentions these techniques and covers a great deal of background material on chemical elements, minerals, rocks, chemical analysis, isotopes, provenance, and chronology in his first chapter (pp. 1-91); chemical analyses are discussed pp. 32-35 and mentioned in other pages (p. 208, 254, 378, 442). For an overview of materials chemistry, see Fahlman, *Materials Chemistry* (2007).

Pollard et al. (2007) is the volume to consult for analytical techniques, Pollard and Heron (2008) provide a general overview and a series of relevant case studies, while Goffer (2007) provides very little on techniques but covers the breadth of materials that archaeologists encounter – stone, clay and ceramics, glass, metals, fibers, organic materials, human

remains, etc. The following table provides a brief assessment of contents on selected topics related to clays, pottery, ceramics, and vessel contents. The numbers refer to page numbers, the * versus # (substantive scattered references vs. mentioned) indicate magnitudes of coverage.

	Pollard et al. (2007)	Pollard & Heron (2008)	Goffer (2007)
Optical	#	24-33	-
Chem. Analysis	-	-	29-43
Spectroscopy etc.	70-92/160-190	-	-
AAS	48-56	25-29	34-35
OES	47	-	-
AES	57-58+ *	34-38/45-59	-
ICP-AES	57-58+ *	29-33	-
AMS	-	271	208
ICP-MS	195-214+ #	31-33	-
MC-ICP-MS	201-202	-	-
LA-ICP-MS	58-61+ *	60-61/324-325	
GC-MS	174-176+ *	-	-
TEM	-	47	-
TIMS	-	57, 312	-
XPS	101-102 + #	39-40	-
FTIR	-	-	32, 378
X-ray etc.	92-122		
XRD	113-116+ *	-	#
XRF	101-109/118-120	38-45/207-209	#
EDXRF	102 + #	42-45	-
WDXRF	104 + #	43-47	-
PIXE	116, 121, 131	49-50	-
SEM	-	-	254
NAA	123-136/200-201	50-56	-
FNAA	-	51-52	-
History	-	1-17	-
Clays/Pottery/Ceramics	67, 119, 132	98-143/	231-260, 429-430

Pollard et al. (2007) briefly mention clays, pottery or ceramic materials (p. 67, 119, 132) whereas Pollard and Heron (2008) devote a chapter to these topics, "The Geochemistry of Clays and the Provenance of Ceramics" (pp. 98-143) in which they consider the importance of ceramics in archaeological research, the structure of clay minerals, the classification of clays by their uses and properties, the firing of clays and the mineralogical composition of ceramics, trace element geochemistry in clays (porcelains as an example), and – as a case study – the provenance of archaeological ceramics: Roman Finewares ("Rhenish" wares and terra sigillata). Trace element analysis by NAA and ICP (ICP-AES and ICP-MS), and minor element analysis (AAS and XRF) are noted; thin section petrography isn't mentioned. Goffer (2007) also has a chapter on the subject: "Chapter 7: Clay: Pottery and Other Ceramic Materials (pp. 231-260,) in which he reviews primary and secondary clays, clay and ceramic materials, ceramic materials, pre-ceramics, components of ceramic materials (pp. 231-239), fabricating ceramics (pp. 240-245), kilns, the color of fired pottery, glazing, the common ceramic materials (pp. 246-250), including terra cotta, earthenware, stoneware, and porcelain. He also provides a set of examples (not really case studies) (pp. 250-260): Attic vase painting, coral red Attic pottery, manganese black decoration, Islamic stone-paste, and Egyptian faience. The last section of the chapter focus on the firing conditions of ancient pottery, provenance of pottery, and the dating pottery.

Each volume is unique and has something to recommend it to the reader. The information is accurate and up-to-date and the illustrations are clear and crisp. The only negative issue is that the bibliography in the Goffer (2007) volume contains typographical errors and the citations to chapters and articles in books and monographs, in the main, do not include pagination.

Previous Meetings

The *Archaeological Institute of America's* 110th annual meeting was held in Philadelphia, Pennsylvania from 8-11 January 2009. The paper and poster abstracts are online and searchable, www.archaeological.org/webinfo.php?page=10489 A highlight of the meeting was the session "Pottery Production and Trade" which included half a dozen papers, some of which utilized INAA. These papers were: "Lead Glaze on a Fifth-Century B.C. Athenian Vessel" by Joseph A. Lillywhite (University of Cincinnati); "Pottery Production and Exchange in the Sixth Century B.C.E.: New Results from the Western Mediterranean" by Ulrike Krotscheck (Evergreen College), M. D. Glascock and J. R. Ferguson, (University of Missouri Research Reactor Center); "The Introduction of the Red-Figure Technique" by Susan I. Rotroff (Washington University in Saint Louis); "Corinthian Pottery and Archaic Greek Trade" by Catherine Cooper (University of Cambridge); "Corinthi vestigium vix relictum est? New Evidence for Pottery Production in Post-Mummian Corinth" by Sarah A. James (University of Texas at Austin); and "Late Hellenistic and Roman Pottery at Ilion (Troia)" by Billur Tekkök (Bilkent University), Sebastian Heath (American Numismatic Society), and Ernst Pernicka (Eberhard Karls University of Tübingen).

Other papers and posters on ceramics included: "Athenian Pottery, Metal Vessels, and Local Taste at Morgantina" by Justin St. P. Walsh (Louisiana State University) and Carla Antonaccio (Duke University); "The Kinneret Boat" by Jerome Hall (University of San Diego); "Bronze Age Obsidian Trade in Sardinia (Italy): The Use of Monte Arci Subsources at Duos Nuraghes and Other Sites" by Robert H. Tykot and Kyle P. Freund (University of South Florida); "Out of the Cave and into the City: Evidence for Corinthian Nymph Cult" by Theodora Kopestonsky (University at Buffalo); "Representations of Late Bronze Age Aegean Ceramics in a Notebook of Sir W. F. Petrie" a poster by Beth Ann Judas (University of Pennsylvania); "Light Frame Architecture at Poggio Civitate: A Comparison of Elite and Non-Elite Domiciles" by Andrea Rodriguez (University of Florida) and Andrew Carroll and Anthony Tuck (University of Massachusetts, Amherst); "Do Decorative Motifs have a Meaning? Ceramics, Textiles, Frescoes, and Social Agendas in Late Bronze Age Crete" by Eleni Hatzaki (University of Cincinnati); "Hero Cult at Troy"

by Carolyn Chabot Aslan (Koç University); "Rethinking the Underwater Material Record off Southeast Cyprus: The Eastern Cyprus Maritime Survey 2007-2008" by Justin Leidwanger (University of Pennsylvania); "Late Minoan Pottery at the Bouffo (Sissi, Crete): A Preliminary Examination" by Charlotte Langohr (Université Catholique de Louvain); "Public, Private, and Clan Property in Etruria' by Hilary Becker, Washington and Lee University); "Phreatic Caves and Anatolian Rockcut Tombs" by Peri Johnson (University of Pennsylvania); "Exploring Cultural Interaction in a Sixth-Millennium Neighborhood: The Case of Tell Kurdu, Turkey" by Rana Özbal, Bogazici (University of Istanbul); "Natural Environment and Human Settlement around Lake Maliq (Korça Basin, South-Eastern Albania) during the Prehistoric Period" by Gilles Touchais (Université Paris 1, Panthéon-Sorbonne), Cécile Oberweiler (CNRS, UMR 7041, Archéologie et Sciences de l'Antiquité), and Petrika Lera (Archaeological Institute of Albania, Museum of Korça); and "Ceramic Transformations and Cooking Practice at the Mycenaean Palace of Nestor at Pylos" by (Julie Hruby, Berea College). A poster, "The Conundrum of the Workshop or Etruscan Utilitarian Ceramics: A Compositional Analysis," prepared by William Gilstrap (California State University, Long Beach) and Anthony Tuck (University of Massachusetts, Amherst) reported the use of LA-ICP-MS in the analysis of Etruscan ceramics which revealed unexpected similarities between utilitarian artifact classes and further suggests a lack of need for the importation of raw materials for large-scale ceramic production. Coarseware ceramics and ceramic roofing tiles have been linked to local clay deposits based on locality and compositional analysis. Local clay-mineral deposits can now be recognized as the main raw material procurement area for the production of ceramics at the workshop on Poggio Civitate. The determination of local origins comes in spite of a paste preparation technique that makes bulk compositional analyses inaccurate without proper attention to anthropogenic factors.

Forthcoming Meetings

Ceramic Petrology Group: There will be a Day Meeting of the Ceramic Petrology Group on Thursday, 19 February 2009, from 9:00 a.m.-7:00 p.m. at the University College London's Institute of Archaeology, London, UK. The meeting is co-sponsored by the UCL Institute of Archaeology Materials Science and Data Analysis Research Group. Alice Hunt has been receiving titles and abstracts of papers at alice.hunt@ucl.ac.uk. Following the paper presentations, the Ceramic Petrology Group will hold a meeting of its members. The preliminary agenda includes: the election of New Officers: the post of Hon. Secretary is up for nomination (contact Caroline Cartwright to put forward other nominations, at ccartwright@thebritishmuseum.ac.uk); a discussion of the CPG vision and recruitment of new CPG members; and *Old Potter's Almanack*: call for more contributions. If you would like to become a CPG member send a sterling cheque for £7.50 (2008 subscription) or £10.00 made payable to "Ceramic Petrology Group" to Caroline Cartwright, Conservation & Scientific Research, British Museum, London WC1B 3DG.

Society for American Archaeology 74th annual meeting, 22-26 April 2009, Atlanta, Georgia, USA. Four sessions are relevant to readers of this column, see http://www.saa.org/meetings/prelimprogram.html "Symposium: Technology as Practice: Polychrome and Glaze-Painted Pottery in the Late Prehispanic Southwest." Organized by Linda Cordell, Chaired by Judith A. Habicht-Mauche. Participants: Linda Cordell and Judith Habicht-Mauche; Deborah L. Huntley, Thomas Fenn, Judith Habicht-Mauche and Barbara Mills; Eric Blinman, Cynthia Herhahn, Kari Schleher and Tom Dickerson; David A. Phillips; Patrick D. Lyons and Jeffery Clark; Dennis Gilpin and Kelley Hays-Gilpin; Suzanne L. Eckert; Hayward H. Franklin and Kari L. Schleher; Ann Ramenofsky; Kari L. Schleher, Deborah Huntley and Cynthia Herhahn; Diane Curewitz and Sheila Goff; David H Snow; Noah H. Thomas; Jennifer Boyd Dyer; and Heather N. Atherton. Discussant: Rosemary Joyce.

"Symposium: 2009 Fryxell Award: Michael D,. Glascock and the MURR Archaeometry Laboratory." Organized and Chaired by Robert J. Speakman. Participants: Hector Neff; Ronald L. Bishop, M. James Blackman and Erin L. Sears; Robert J. Speakman, Darrell Creel and Myles Miller; Robert H. Tykot; and Cynthia L. Otis Charlton and Thomas H. Charlton. Discussants: Barbara L. Stark; Michael D. Glascock. "General Session: New Directions in Ceramic Studies." Chaired by Brenda Bowser. Participants: Brenda Bowser and Andrew Duff; Bart McLeod, Travis Doering and Lori D Collins; Michael W. Gregg, Greg Slater & Edward Banning; Amy J. Hirshman; and Alan F. Greene and Charles Hartley.

"Sponsored Symposium: Beyond Provenance: Ceramic Petrography and Ceramic Technology." (Sponsored by Society for Archaeological Sciences), organized by Maria Masucci (Drew University) will be held the afternoon of 23 April 2009. Kari L Schleher (University of New Mexico) will serve as moderator; the discussants are John Hoopes (University of Kansas) and Charles C. Kolb (National Endowment for the Humanities). Symposium Abstract: Petrographic analysis is primarily associated with provenance studies. A less documented but potentially valuable avenue is what petrography reveals about ceramic technology. Insight into the relationship of fabrics to function informs on relationships of technology, function, tradition and intentionality of potters. Identifications of inclusions informs on tempering strategies and the relationship of potters to their environment. Experimental work and evidence of forming methods are rarely highlighted in publications focused on provenance. This symposium brings together scholars for the opportunity to focus on findings in ceramic technology as identifiable through ceramic petrography. These data are the undocumented promise of ceramic petrography.

The Clay Minerals Society invites those interested to submit an abstract to the session "Reactions of Iron in Clays and Clay Minerals" to be held at the 2009 Annual Meetings of the Clay Minerals Society in Billings, Montana, USA, 5-11 June 2009, in honor of the work of Professor J.W. Stucki, next recipient of the Marilyn and Sturges W. Bailey Award. Session

abstract: "Iron is the fourth most abundant element in the Earth's crust, and present in nearly all clay minerals. Reactions of this important transition metal in clays and clay minerals impacts their structures, surface reactivity, physical properties and the phases formed. Abiotic and biotic reduction-oxidation reactions of iron in clay minerals are implicated in loss of clay swelling, cation fixation, illite formation, as well as many surface catalyzed reactions of organic and inorganic solutes. The mobility and movement of iron and other ions such as ammonium in soils and sediments is influenced by both abiotic and biotic reactions through the ubiquitous iron oxides, oxyhydroxides and hydroxysulfates. This symposium is designed to bring together the leading research on reactions of iron, and those who apply spectroscopic techniques to the study of chemical reactions in soils, sediments, clays and clay minerals." For further information on the conference please visit: http://cms.clays.org/meetings.

The 14th International Clay Conference (http://www.14icc.org) is being held in Castellaneta Marina (Italy) from 14-20 June 2009. The Conference will be at the Calane Conference Centre, Nova Yardinia Resort, located near Castellaneta Marina, on the Ionian Sea. Dr. Saverio Fiore is the organizer of this year's conference. Abstracts for oral and poster presentations were due 31 December 2008 and abstract acceptances will be sent by 30 March 2009; registration fees are due by 30 April 2009. The abstracts are being reviewed by the members of the Scientific Committee or by international experts. The selection of the abstracts and their mode of presentation will be decided by the Scientific Committee on the basis of the review results.

There are eight clusters of symposia: Bio-clays (1 session); Ceramics and Engineering (8 sessions); Geology and Geochemistry (5); Health and environment (10); Mineralogy and Crystallography (7); Nano and Porous Materials (8); Soils and Sediments (2); and Miscellaneous (3). One Ceramics and Engineering session is relevant to readers of this column: CE 1: Clays in Archaeology and Cultural Heritage. Abstract: The aim of the session is to create a focus on the application of Science to the study and conservation of ancient ceramics, which is a constant leitmotiv in advanced countries. Such an interdisciplinary application of Science is a fundamental tool to disclose hidden information, such as the provenance and typology of the raw materials (clays), the ancient recipes (treatment of the clays), the firing technology and the alteration pathway. The current knowledge has demonstrated the key role of clays in degradation of monuments built in clay-bricks and natural stones. A variety of pathologies on building materials can be a consequence of the interaction of clay particles with fluid transfer, moisture evaporation, saline solutions, and by a sharp change in temperature; due to these processes clay minerals can developed swelling-shrinking phenomena, aggregation-disaggregation, thermal expansions, etc. The session is undoubtedly a good opportunity to bring together geologists, chemists, engineers and possibly other people engaged in this area to discuss advances, problems, and solutions for a variety of ceramic topics. The convener(s) are Bruno Fabbri (bruno.fabbri@istec.cnr.it) and (Marino Maggetti marino.maggetti@unifr.ch).

10th European Meeting on Ancient Ceramics: The University College London (UCL) Institute of Archaeology and the British Museum are co-organizers of the tenth anniversary European Meeting on Ancient Ceramics (EMAC), to be held at the British Museum in London, 10-13 September 2009. The main focus of EMAC is the scientific study and archaeological interpretation of ancient ceramics. Bringing together established scholars and young researchers from a wide range of academic backgrounds, including archaeologists, ceramic petrologists, chemists, material scientists, geologists and art historians, EMAC stimulates an international and cross-faculty exchange of ideas and approaches. EMAC is committed to make this meeting especially inclusive and solicits contributions from non-European countries, and on non-European ceramics. Several keynote speakers from outside Europe have been invited. The following themes will be covered: Technology and Provenance, Methodological Developments, Dating, Technical Ceramics, Building Materials, Islamic Ceramics, and Residue analysis. All delegates will receive a copy of the volume that will be published with selected conference papers.

Important Dates: Deadline for abstract submission: 31 March 2009; deadline for early registration with reduced fee: 15 May 2009; notification of acceptance of abstracts: late April 2009; conference dates: 10-13 September 2009; conference dinner: 12 September 2009; and conference excursion: 13th September 2009, Fees (payable in British Pounds [GBP]): Ordinary registration: before 15th May, £120 / after 15th May, £150; student registration: before 15th May, £80 / after 15th May, £100 (note that a proof of student status will be required); conference dinner at the British Academy: £60; and excursion to Wedgwood Visitor Centre and Museum in Stoke-on-Trent: £45. London's EMAC '09, coinciding with Wedgwood's 250th anniversary, will have a special themed session "From Craft to Science," to promote and discuss the study of ceramics produced in the wake of the Industrial Revolution. In addition, there will be a one-day excursion to Stoke-on-Trent on Sunday 13th, to visit the newly refurbished Wedgwood Visitor Centre and Museum. For further information, registration and submission of abstracts please visit the following website: www.ucl.ac.uk/EMAC09 Contact: Dr. Marcos Martinón-Torres, Institute of Archaeology, University College London, 31-34 Gordon Square, London WC1H 0PY, United Kingdom; e-mail: m.martinon-torres@ucl.ac.uk.

New Journal

Archaeogate: Journal of Experimental Archaeology 1-2008 (Editura Universitaii din Bucaresti), edited by Dragos Gheorghiu and George Nash. Contents: Dragos Gheorghiu and George Nash, "Introduction"; George Nash, "Feasting Fire, Illuminating Fire, Ritual Fire: A Case for its Use in the Late Neolithic Passage Grave Tradition in Wales': George Dimitridatis, "A Brief Overview on 'Topographical Patterns' and Pyrothechnology [sic.] Utensils in Rock Art Landscapes";

Henry C. Dosedla, "Space Concepts and the Significance of Fire in New Guinean Highlands Traditions"; Stanislas A. Grigoriev, "Experiments with Ancient Smelting Process on the Turgoyak Lake"; Fabio Cavulli and Dragos Gheorghiu, "Looking for A Methodology Burning Wattle abd [sic.] Daub Housing Structures. A Preliminary Report on An Arcaheological [sic.] Experiment"; and Dragos Gheorghiu, "The Building of A Chalcolithic Dwelling for A Pyroexperiment." Other contents: Preliminary Reports, Preliminary Reports [CNCSIS Research Grant 945], News, Book Review. For further informations [sic.], visit the website, http://www.editura.unibuc.ro.

Exhibition

Golden Seams: The Japanese Art of Mending Ceramics is an exhibition from 8 November 2008-10 May 2009 at the Freer Gallery of Art, Smithsonian Institution, Washington, DC. While clay vessels are remarkably durable, they are vulnerable to breakage if dropped or mishandled. This exhibition of 13 vessels from China, Vietnam, Korea, and Japan were mended and enhanced by a distinctive Japanese technique. Japanese craftsmen employed a longstanding practice of using the plant resin lacquer as an adhesive to rejoin broken pieces but transformed the appearance of the repair by sprinkling the lacquer with powdered gold, thereby creating a new aesthetic. These gold lacquer repairs were closely associated with ceramic utensils used for tea (*chanoyu*) and in the tea ceremony.

Book Reviews

Deborah L. Huntley, Associate Editor

Encyclopedia of Archaeology, Volumes 1-3. Deborah M. Pearsall (editor), Elsevier, 2007, 2532 pp. Price: $895 USD, $745 EUR, $515 GBP (cloth). ISBN: 0-12-548030-X.

Reviewed by Amy V. Margaris, Department of Anthropology, Oberlin College, 10 N. Professor St., Oberlin, OH 44074, USA

As a child, I passed many happy hours in my family's wood-paneled basement in the company of a nearly complete, and only slightly musty set of the *World Book Encyclopedia*. It was from its smooth, cool pages that I first learned about the toucan's multi-hued bill, and that the planet Mercury was not, in fact, made of metal. Although the *Encyclopedia of Archaeology* is a far cry from the *World Book*, its perusal brings back a thrill of discovery from my childhood, and the security of knowing that a vast treasure house of information could be contained on a single bookshelf.

The Encyclopedia of Archaeology is a physically weighty but mostly user-friendly work whose organization takes its cue from the hyperlinked connectivity and multiple search options offered by online resources. The Encyclopedia's contents are arranged alphabetically by entry (e.g., Lithics), with some entries split into multiple articles (e.g., Use Wear Analysis; Manufacture). A separate Subject Area table of contents groups entries according to such themes as Archaeology in the Everyday World, and The 21st Century: A World Overview; an extensive subject index offers yet another means for searching the work's contents. (My favorite method, of opening a volume to savor a random entry as one might a collection of delectable recipes, was also effective.) To offer some minor quibbles, the multiple search options proved useful for locating the entry on the American Southwest, Four Corners Region (Paul F. Reed), which was omitted from the Subject Area listing. The index is very detailed, but several levels of subheadings make it occasionally difficult to gain one's alphabetical bearings. Dictionary-style headers indicating topics covered on each page (e.g., "site formation—slag analysis") would solve the problem.

I begin my review of this expansive, three-volume set by describing its overall organization and the standardized structure of the 281 peer-reviewed articles contained within it. I then highlight several articles on a range of topics in order to demonstrate the diversity of content and range of success that entries meet towards the editors' goal of compiling an encyclopedia that is accessible to scholars, professionals, students, and laypersons. Toward that end, I feel it appropriate to include the opinions of some undergraduate students here. I offered students enrolled in my introductory course in human evolution the opportunity to prepare a 2-3 page review of an article of their choice for a small measure of extra credit. They were asked to comment on the article's organization, readability, content, and degree of appropriateness for introductory level college students. I also requested feedback regarding the likelihood of their consulting the Encyclopedia versus online resources when conducting research for term papers. I will highlight some of their reactions in relevant places below.

Individual entries were penned by authoritative figures in the discipline, and were carefully selected to represent a true diversity of geographical, methodological, and theoretical perspectives in the field. My students and I were impressed at the range of topics covered, from Computer Simulation Modeling (Mark Lake) to Ethnoarchaeology (Margaret E. Beck), to Archaeology in Asia (represented by a full 34 articles organized by sub-region and time period). The Encyclopedia is equally excellent at providing a quick brush-up on Marxist Archaeology (LouAnn Wurst) or Pollen Analysis (John G. Jones) and for keeping current outside of one's research area. To illustrate, William Fitzhugh's 25 page entry on "Arctic and Circumpolar Regions" is one of the longer entries, but is so comprehensive and engagingly written as to provide an essential primer for anyone stepping freshly into Arctic archaeology. Simply viewing the subject area listing was valuable for students to gain an appreciation for the incredible diversity of the field and its potential to stimulate interest from a wide audience.

Most entries are found in the bite-sized range of 3 to 10 pages, and all conform to a standardized format, which allows the reader to gather information quickly and facilitates movement between articles on related topics. Each entry is

prefaced with a glossary, peppered liberally with figures and illustrations (many in color, nearly all of high quality) and concludes with a list of cross-referenced terms and suggestions for further reading. Several students commented on the potential usefulness of the cross-referenced terms and "Further Reading" section. The glossary feature was also a big hit among the students, as one complained of the difficulty of getting a handle on technical terms found in scholarly articles. One was pleased that many of the articles referenced in her entry were accessible through JSTOR. In short, these features were attractive to a generation accustomed to the web world of linked texts and non-linear forms of information gathering. Crucially, all nine students felt the content of their article was fully or mostly accessible to college students in an introductory anthropology course, and provided a good starting point for students conducting initial research for a course paper on that topic.

This Encyclopedia nearly bursts at its seams with information, and represents a monumental investment of author, publisher, and editor efforts. And yet like most reference materials, it faces the problem of a limited shelf-life, whether stemming from improved methods, new data, or changes in the ways archaeologists interact with stakeholder communities. A number of authors writing on analytical techniques have wisely sidestepped the problem by avoiding lengthy descriptions of specific types of instrumentation guaranteed to be outmoded, and focus instead on general principles behind analytical approaches and the major questions that guide their use.

For example, the entry on "Archaeometry" (Michael D. Glascock) could easily have offered a scattershot array of information on the great arsenal of techniques deemed "archaeometric" in nature. Instead, Glascock chose to present technical descriptions of analytical techniques up front in an extensive glossary. Avoiding heavy jargon within the main text freed the author to focus on the historical development of six facets of the field: Materials Characterization, Dating, Prospection, Conservation, Man and His Environment, and the Handling and Modeling of Data. Some themes receive more treatment than others: Man and His Environment contains a mere two sentences. But Glascock's discussion of the future of the field raises a key issue that neatly unites all six of the author's themes, the need to close the communication gap which too frequently divides the natural scientists who generate archaeometric data from the archaeologists who use that data to address anthropological research questions (Killick and Young 1997; Lengyel and Margaris 2005).

Related entries on Luminescence Dating (James Feathers) and Electronic Spin Resonance Dating (Rainer Grün) prove more technical than Glascock's piece, but here, too, the glossary is an essential aid. The dating articles are especially successful when read in tandem, as occasionally terms used in one entry are more fully defined in the other (e.g., Feathers' explanation of "anomalous fading"). A student reviewer majoring in chemistry felt that a paper on ESR and TL dating which he had written earlier would have been substantially improved had he had access to the Encyclopedia's entries on these topics.

Not all entries are equally successful. Perhaps in an attempt to increase their longevity, I found some articles were oddly detached from larger contexts. "Antiquities and Cultural Heritage Legislation" (Don D. Fowler) is very general, and lacked even brief case studies to ground the concepts covered. The short entry on "NAGPRA" (Keith W. Kintigh) provides a straightforward but surprisingly dry review of the law and two brief court cases stemming from it. Both entries are more enlivened when read along with others such as "World Heritage Sites, Types and Laws" (Sandra Pelegrini), "Who Owns the Past" (Lynne Goldstein), and the especially engaging piece on "Native Peoples and Archaeology" (George P. Nicholas). Nonetheless, my first impression upon reading a series of entries related to the theme of Archaeology in the Everyday World was that some facets of the field which relate to ethics and the law simply do not lend themselves well to encyclopedic treatment. Encouraging students to troll news headlines and clearinghouses such as the AIA's Archaeology in the News website (http://www.archaeology.org/news/) is perhaps one of the best ways to demonstrate the tensions and dynamism of a field most commonly viewed as relating only to people and events of the deep past.

Yet a reader would gain a sadly incomplete sense of the field if our ethical concerns and responsibilities did not receive substantial treatment in the Encyclopedia, especially as it is the goal of the editors "Not only to showcase archaeological knowledge at the beginning of the twenty-first century, but to convey how archaeologists work, and to illustrate the diversity of issues and theoretical paradigms that drive our research" (page ix). Upon further thought, I have concluded that the Encyclopedia's biggest problem lies less in its content than in its structure: the work may simply contain too many entries. The rationale behind the balkanization of topics is certainly logical. Extensive cross-listing of entries means that a reader can build up information on a topic of interest on a modular basis, that is, by piecing together a series of related entries. In a web environment, hypertext links encourage maneuverability of this sort but in hard copy, flipping between entries found scattered between three hefty volumes is a more awkward procedure, and one that has the potential to promote a sense of disjointedness of topics rather than interrelatedness.

Fortunately, the Encyclopedia is also available online with a subscription to ScienceDirect, and in this format the Encyclopedia will surely shine most brightly. Active search features, and links internal to the Encyclopedia and to outside journal articles and abstract databases are some of the promising-sounding online features. Here again, the views of my students are revealing. Five out of nine students commented on the role of the internet in conducting research for course papers, and it is a sign of the times that all five felt there was a significant liability associated with print reference materials. Some felt that if prodded by their professor they would consult a print copy of the Encyclopedia in our campus library; others admitted that despite the appeal of the work, they would more readily turn to articles available online through JSTOR when beginning their research, or even–yes–to Wikipedia.

Modestly-funded schools or libraries may be unable to afford the ScienceDirect subscription, however, and the price tag of even the print version places it out of reach of most individuals. The electronic version promises to be the best option where financially feasible, but I recommend without hesitation the print copy as an addition to your campus or company library. The Encyclopedia is quickly becoming my secret weapon: I consult it frequently, and with relish. It has deepened my own appreciation of the field, including its global scale, and it provides case studies which I am incorporating into my classroom teaching. For those with library access to the hard copy only, special effort may be required to lure students to the stacks, but it would be well worth it in order to make maximum use of this rich and compelling reference work.

Acknowledgements

A special thank you to Julian Cartwright, Zach Diamond, Jon Hunter, Shigeko Landin, Samantha Lansford, Nina Moffitt, Caitlin O'Brien, Kendra Pettis, and Maggie Rosenberg, my insightful undergraduate student consultants from Anthropology 102 at Oberlin College, Spring 2008.

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Dictionary of Artifacts. Barbara Ann Kipfer, Blackwell Publishing: Malden, MA, US, 2007. ix + 346 pp. Price USD $132.95 or £75.00 (cloth). ISBN: 1-4051-1887-3.

Reviewed by Maxine McBrinn, Department of Anthropology, University of Colorado, Boulder, CO, 80302, USA

Last semester, I searched several times for unambiguous and easy to understand definitions of standard archaeological terms to share with my class. Generally, I used the Google search engine to find definitions, and then chose the best alternative. More than once I wrote my own, because the on-line alternatives were deficient or didn't match my purpose. Barbara Ann Kipfer's *Dictionary of Artifacts* endeavors to fill this niche, as well as many others. The author says (p. *vii*) this book is for "students, archaeology professors, archaeologists, museum staff, archaeology volunteers, and general readers who want informative definitions in accessible language about the vocabulary describing artifacts." This statement makes the book sound like something we should all have in our libraries, but after reading it, this volume seems better suited to a more limited audience. Unfortunately, I can not unreservedly recommend this book.

The preface (p. *vii*) notes that the dictionary covers the vocabulary used to describe artifacts, their "discovery, analysis, typology, dating, and conservation …, and types of basic artifacts…" The author notes that only very major subtypes are defined, and that specific historical artifacts are not included; also excluded are most of the thousands of pottery types and most projectile point types. The purpose (*viii*) is to "put in one place the basic terminology for all categories of artifacts." In other words, the goal is to include generally used terms while excluding those very specific or highly technical terms that are used less often, or used only in geographically limited areas.

The structure of the book follows this purpose. Entries are listed alphabetically. Each entry includes the header then provides one or more definitions for the word as it is used archaeologically. Some entries include synonyms and/or line drawings or other illustrations, and there are even a very few photographs. There is no bibliography, and neither pronunciation guides nor cross-references are provided, despite the publisher's website description. I understand the lack of a bibliography, given the hair-raising logistics entailed in trying to provide references for almost 3000 entries, but I miss the pronunciation guide, which I would welcome. For example, those in the profession are unlikely to need help articulating *Acheulian*, but this may not be true for our students, who are potentially a significant audience for this book. I would have also welcomed the use of cross-references, although this lack is mitigated by the fact that synonyms are provided for some entries.

There is a lot to like about this book. It provides a large number of entries, over 2000, according to the preface, or almost 3000, as stated on the publisher's webpage. No matter the actual number, the book includes many definitions, and the entries cover a wider range of terms than may at first be realized. For example, *transitional* (p. 321), defined as "a term used to describe an artifact that was utilized and manufactured across two or more cultural periods," fits the stated purpose of the book, as do trait, trace, transfer printing, and transverse plane, among many others on that double-page spread alone. As promised in the preface, most definitions are wonderfully concise and yet are unambiguous. The author has a strong background in both lexicology and archaeology, and it shows in the clarity of her language.

As a North American archaeologist, I was surprised by the number of terms that I didn't immediately recognize, such as the first two in the "B" section, *B ware* and *bacini*. The first of these labels ceramic amphorae found in the eastern Mediterranean and the second is a kind of pottery vessel that was used in northern Italian medieval churches. These terms are peculiarly rooted in European archaeology, a category that constitutes a larger than expected percentage of the total number of entries. For example, on one random double-page spread (pp. 30-31), seven out of thirteen (54%) of the entries refer to purely European artifact types or to specific European artifacts. Other entries deal with non-European Old World artifacts or cultures, leaving those that apply uniquely to New World cultures a decided minority. Some of the Old World entries also seem

to contradict the author's statement that specific historical artifacts (p. *vii*) are not included. Indeed, there is a definition of the Bayeux Tapestry that covers more than half a page, and other specific artifacts, such as the Ardagh Chalice and the Phigalian Marbles, are also included. In addition to a large percentage of entries specific to the Old World, some definitions did not acknowledge New World usage of what might otherwise seem Old World terms. For example, the definition for *celt* did not mention that the word is also widely used in the Eastern US to label some ground-stone and copper axes.

The heavy emphasis on Old World cultures means that there is less space to devote to American prehistory. Several terms I expected to see defined were not incorporated, including Lovelock Wickerware (a unique Great Basin basketry type), Ramey knife, tomol or plank canoe, and Salado Polychrome, a class of southwestern U.S. ceramic types generally associated with social integration of migrating peoples and the development of the Southwestern Regional Cult (also known as the Katsina Cult.) Each of these artifact types is unique, very limited in space and time, and has been the subject of dedicated research. Surely they merit inclusion as much as *Whitby-type ware*, middle Saxon pottery from around Whitby, England. In addition to a relative lack of American archaeological vocabulary, other terms I expected to see were missing. For example, neither micaceous ware nor Hohokam is defined. Of course, in any book of this type, there will be unintended exclusions due to the enormous scale of the endeavor. Perhaps some of the omissions will be rectified if there is a revised edition.

Finally, there are errors in a very small percentage of the definitions. For example, the *Basketmaker tradition* of the US Southwest is defined as having three stages, Basketmaker I, Basketmaker II, and Basketmaker III. While Basketmaker II and Basketmaker III are widely used chronological categories, Basketmaker I, defined here as dating from c. 1000 to 1 B.C., was reserved by A.V. Kidder for a hypothesized pre-agricultural stage, and is the one Pecos classification category that is no longer used (Cordell, *Archaeology of the Southwest,* 1997, p. 164).

This volume is listed by the publisher as selling for $132.95, a substantial sum that may limit sales. Because of the strong bias toward European, and especially English, terminology, it is most useful for archaeologists working in the UK and nearby regions. I also strongly recommend it for inclusion in libraries and other reference collections. American archaeologists may find it too expensive and too limited in scope to warrant adding it to their personal libraries.

Upcoming Conferences

Rachel S. Popelka-Filcoff, Associate Editor

2009

16-20 February. World of Iron (WIC); London, UK. General information: http://www.ironsmelting.net/WIC2009.

21 February. HMS Spring Meeting: Urban archaeometallurgy: historical metallurgy in towns and cities; London, UK. General information: http://hist-met.org/2009workshop.html.

10-12 March. Climate Change: Global Risks, Challenges and Decisions; Copenhagen, Denmark. General information: www.climatecongress.ku.dk.

22-26 March. Annual Conference on Computer Applications and Quantitative Methods in Archaeology: "Making History Interactive;" Williamsburg, Virginia, USA. General information: htttp://www.caa2009.org.

22-26 March. 237th National Meeting and Exposition, American Chemical Society; Salt Lake City, Utah, USA. General information: http://www.acs.org.

22-27 March. Association of American Geographers; Las Vegas, Nevada, USA. Special session: "Soils, Sediments and Geoarchaeology." General information: http://www.aag.org.

31 March - 4 April. American Association of Physical Anthropologists Annual Meeting; Chicago, Illinois, USA. General information: http://physanth.org/annmeet.

31 March - 4 April. Paleoanthropology Society Meetings, held in conjunction with the American Association of Physical Anthropologists Annual Meeting; Chicago, Illinois, USA. General information: http://www.paleoanthro.org/meeting.htm.

15-17 April. Geoarchaeology 2009: "Landscape to Laboratory and Back Again;" Sheffield, UK. General information: http://www.shef.ac.uk/scidr/geoarchaeology2009.

19-24 April. General Assembly of the European Geosciences Union; Vienna, Austria. General information: http://meetingorganizer.copernicus.org/EGU2009/sessionprogramme.

22-26 April. Society for American Archaeology 74th Annual Meeting; Atlanta, Georgia, USA. General information: http://www.saa.org/meetings/index.html.

27-30 April. TECHNART 2009, Non-destructive and Microanalytical Techniques in Art and Cultural Heritage; Athens, Greece. General information: http://www.inp.demokritos.gr/~technart2009/index.php.

3-8 May. CANQUA-CGRG Biennial Meeting; Burnaby, British Columbia, Canada. General information: http://www.sfu.ca/earth-sciences/CANQUA.

11-13 May. AURUM: Authentication and Analysis of Gold Work; Paris, France. General information: http://www.aurum.cnrs.fr.

24-27 May. American Geophysical Union, 2009 Joint Assembly (The Meeting of the Americas); Toronto, Ontario, Canada. General information: http://www.agu.org/meetings/ja09.

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Newsletter of the Society for Archaeological Sciences

Published quarterly by the Society for Archaeological Sciences
Distributed to subscribers: $20/yr regular membership; $15.00 student & retired; $30.00 institutional; $300 lifetime. Individuals add $105.00/yr for *Journal of Archaeological Science*; $35/year for *Archaeometry*. ISSN 0899-8922.