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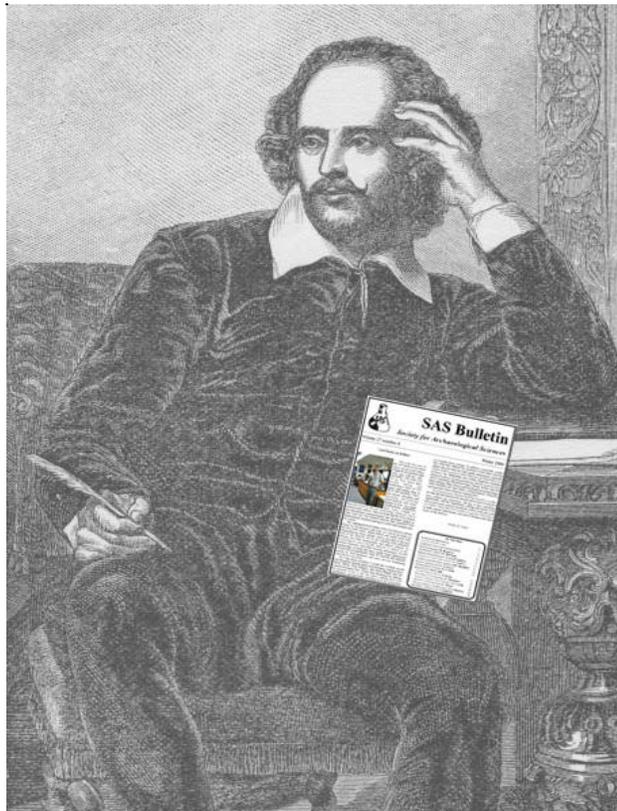
What's in a Name?

What's in a name? A great question by Shakespeare, but an even greater one for the Society for Archaeological Sciences: that which we call the *SAS Bulletin* by any other name would smell as sweet... (Ok, this is why I'm a scientist and not a playwright.) Suffice it to say, we are considering altering the name of the *SAS Bulletin* and would like your opinion on the matter. The rationale for the possible change has to do with updating the society's image (as it is expressed in the printed *Bulletin*) to make it more attractive to potential members—much of the advertising we do to future members takes place at conferences as diverse as those associated with the Society for American Archaeology, Society for Economic Anthropology, Association for the Study of Marble and Other Stones In Antiquity, and International Council for Archaeozoology, among many others. The hope is that a new name for the *Bulletin*—perhaps something that more clearly represents the contents of the magazine—might attract a

broader readership. What do *you* think? Should the name be altered in some way? If so, what should the new name be? What are the (dis)advantages of such a change? A few possible suggestions to spark debate: *The Archaeological Scientist*, *Scientific Archaeology*, *Archaeo-science*, and, of course, *SASsy Bulletin*. Please take just a moment to let me know what you think. I would appreciate hearing your opinion!

In this issue of the *Bulletin*, you will find the usual assortment of employment opportunities, awards and fellowships, and conference news and calls for papers. One of the goals of my tenure as Editor is to increase the space devoted to these sorts of columns so as to preserve the information-rich content of the *Bulletin*. Yet, at the same time, I would like to enhance and encourage dialog among our members. To address this goal, I will continue to feature one or more articles on interdisciplinary research being conducted by our membership. In this issue, for example, Rachel Popelka and her colleagues at the University of Missouri, Columbia, outline a method and emerging results for the geochemical sourcing of red ochres using x-ray fluorescence spectrometry. Rachel is the 2005 R.E. Taylor Award Recipient at the Society for American Archaeology Annual Meeting. Please contact me with your own article idea and I would be happy to work with you to see it to print.

E. Christian Wells



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Employment Opportunities

The Department of Archaeology at the University of Durham is expanding; we have five new posts in the Department. Chair/Readerhips: Three posts are available at Chair/Reader level for outstanding researchers with an established international reputation and demonstrable leadership qualities. Candidates will be exceptional individuals with strong international research profiles, substantial publication records and demonstrable skills in academic leadership and the management of research projects. Areas of particular interest include: 1. The archaeology of Britain and/or Western Europe in the Neolithic, Bronze or Iron Ages, 2. The Prehistory, Bronze or Iron Ages of Aegean/east Mediterranean, 3. Early Medieval Europe (400-1100 AD). Candidates with geographical interests covering other regions of Eurasia, which would be complementary to those of existing staff, are encouraged to apply. Lectureship in Archaeological Science: As part of the University's commitment to its Strategic Improvement Programme, the Department of Archaeology is seeking an exceptional individual with the ability to forge multidisciplinary research links and to develop new joint research initiatives with period/culture specialists. Lectureship in Prehistory: The successful candidate will have interests in the archaeology of Britain, and/or Western Europe in the Neolithic, Bronze or Iron Ages, or the Prehistory, Bronze or Iron Ages of the Aegean/east Mediterranean. For further details of preferred specialists, application deadlines, etc., please see: http://www.dur.ac.uk/archaeology/about_vacancies/about_vacancy.php.

Postdoctoral research associate position at Michigan Tech. The position is to be supported by an NSF Small Grant for Training and Research, which is the product of our efforts here to develop a stronger research domain at the intersection of historical archeology, the history of technology, industrial archeology and material culture, and industrial heritage. We will be launching a new doctoral program in this area in August, expanding our MS in industrial archeology and history of technology, and have plans to develop international linkages as part of the research effort. We are hoping to identify a recent Ph.D. holder for this postdoctoral opportunity. We are seeking an individual with interests in material culture and industrial history, but are trying to cast a very wide net. Beginning scholars with backgrounds in historical archeology, history of technology, environmental history, labor history, historical archeology, and historic preservation are among the possibilities we are willing to entertain. We will develop a program of teaching and research for the holder of this position that combines their interests and strengths with the planned directions of the graduate program. The position will be listed as a one-year posting, with the opportunity of being renewed at least once. There is a good description of the doctoral program itself on our website — <http://www.social.mtu.edu/IHAPhd.htm>. The key features of the program are the integration of the history of technology with historical archeology to produce a strong emphasis upon the material culture of industry. This approach is evident in the composition of the faculty, the structure of the curriculum, and the research undertaken.

Awards, Fellowships, and Training

Research Laboratory for Archaeology and the History of Art, University of Oxford, invites applications for places on the one-year MSc in Archaeological Science and for PhD studentships from October 2005. Bursaries and funding may be available for suitable applicants. Applicants should have, or expect to obtain, a first or upper second class degree (or equivalent) in archaeology or a science subject. PhD Applications are welcomed in all areas of research at the Laboratory, including dating (radiocarbon, OSL, dendrochronology, tephrochronology), biomolecular archaeology (including isotopic studies of diet, nutrition, status, mobility) and materials studies (technology, provenance, conservation science). Letters of application for MSc and PhD (indicating area of interest), accompanied by a CV and names and addresses of two referees, should be sent to Robert Hedges, RLAHA, 6 Keble Road, Oxford OX1 3QJ. Further information is obtainable by email, robert.hedges@rlaha.ox.ac.uk.

The Mariners' Museum, Monitor Conservation, Summer 2005 Student Internship. The Mariners' Museum, official repository of all USS Monitor artifacts and archives, is offering an eight-week summer internship to a graduate student in conservation. The Museum is located in Newport News, Virginia. Primary activities planned for the summer involve deconcreting and recording the mantalets in the interior of the revolving gun turret and the exterior of the outer layer of turret plates, and working on the Monitor's two gun carriages. Recording of turret features will include drafting, photography, and possibly molding. The internship will run from June 13 to August 5, 2005. Due to construction of the new conservation facility, weekend work may be required. A \$5000 stipend is offered. Interested candidates should send a letter of intent and current resume to Neven Garris, Director of Human Resources, via email at ngarris@mariner.org or by post to 100 Museum Dr., Newport News, VA 23606, USA.

The Department of Geography at California State University, Long Beach, invites applications for its Master's Degree Program, for Fall 2005 admission. Geography at CSULB has three main emphases: 1) environmental and physical geography, including palaeoclimatology, hazards, hydrology and water resources, biogeography, and arid lands geomorphology; 2) geospatial technologies and methods, including GIS, remote sensing, cartography, quantitative methods, qualitative methods, and field techniques (featuring a NASA Regional Earth Science Applications Center housed in the Department and Map Lab, which does custom mapping and GIS analysis for the surrounding municipalities and regional agencies); and 3) human geography, including economic geography, urban cultural geography, social geography, and medical geography. Some research and student assistantships are available for American citizens or permanent residents, and the Department has a large internship program. International students should contact our Center for International Education to learn about application and support procedures specific to their situations: <http://www.csulb.edu/>

divisions/aa/grad_undergrad/cie/. To learn more about the CSULB Department of Geography, please visit <http://www.csulb.edu/geography/>. For information on the Master's Degree Program and a link to the requirements of the degree, please visit: <http://www.csulb.edu/geography/geogma.html>. To apply, please send a set of official transcripts and a 1-2 page statement of purpose and arrange for three confidential letters of reference to be sent to the graduate advisor. Letters of reference and statements of purpose may be sent by e-mail or fax. All materials should arrive by 17 June 2005 to ensure accepted applicants are eligible to take classes in Fall 2005. Contact: Dr. Christopher T. Lee, Graduate Advisor, Department of Geography, California State University, Long Beach, CA 90840-1101.

The Institute for Archaeo-Metallurgical Studies (IAMS) Summer School, September 5-16, 2005. The IAMS is affiliated with the Institute of Archaeology at University College London, UK. IAMS is an international body whose purpose is to initiate and promote research into the origins and developments of metallurgy and its culture-historical significance, from its earliest, prehistoric beginnings to recent times. The summer school is run every September on Ancient Mining Technology, Ancient Smelting and Metallurgy. The lecturers will be Professor H.G. Bachmann, Marcos Martinon-Torres, Professor C.T. Shaw, Professor T. Rehren, Professor V. Pigott, Professor B. Rothenberg, and Xander Veldhuijzen. You can attend for one or more days, a week or the whole session. If you are interested in IAMS and would like to receive more information and/or be added to our annual journal list please email to this address: c.cohen@ucl.ac.uk, or visit the website: <http://www.ucl.ac.uk/iams/entry.htm>.

Conference News and Announcements

First International Conference on the Geology of the Tethys, 12-14 November, 2005, Cairo University. Under the Auspices of Prof. Amr Ezzat Salamah H.E. (Minister of Higher Education and State for Scientific Research), Prof. Ali Abdel (Rahman Youssef President of Cairo University), and Prof. Hamdi Mahmoud Hassaneen (Dean of Faculty of Science at Cairo University), the Tethys Geological Society is planning to host every other year, a conference on the "Geology of the Tethys" at Cairo University. The suggested themes are: 1- Regional Geology and Basin Analysis, 2- Precambrian Geology of the Tethys Regions, 3- Geology of Ancient and Recent Deltas, 4- Geology of Hydrocarbon and Mineral Resources, 5- Quaternary Geology of Circum Mediterranean Region, and 6- Geophysical Studies of the Tethys Region. The conference will be held on the premises of Cairo University, hopefully the first one will take place during the period of 12-14 November 2005. A good link between the interested scientists in Europe, America, Asia, Africa and Australia will insure a successful conference. The following are some of the conference activities: 1- Circulars will be distributed among concerned

institutes, 2- Abstracts accepted for the conference will be distributed at the conference, 3- Four field trips will be organized after closing the conference agenda, 4- Companies participating in the conference are encouraged to hold scientific exhibitions, and 5- Papers presented in the conference will be refereed by professionals in the respective fields and published in the conference proceedings. As it is hosting representatives and participants from all over the world, the conference will organize special sessions on natural gas (the clean fuel in the 21st century) to explore ways of expanding regional cooperation, hoping that this will enhance economic development. Abstracts should be submitted before 31 August 2005, up to 300 words written in two languages, in which English is one of them. The originals and two copies of the manuscripts, together with the originals of figures, plates, graphs and charts, should be submitted before 31 October 2005. Registration Fees: participating member 300 US\$ (or # in LE); fees include opening reception, lunch and tea during the conference days, closing dinner, and publications and proceedings of the conference. Conference registration fees and field trip fees can be paid in cash on registration desk or cheque payable to The Tethys Geological Society, Account No. 01000715565, National Bank of Egypt, Cairo University Branch, Giza, Egypt, Code Swift: NBEGEG c x 164. Excursions: Greater Cairo (15/11/2005 - 50 US\$), El Fayium Depression (15/11/2005, 75 US\$). Luxor - Aswan (16-20/11/2005 - 500 US\$), Central & Southern Sinai (16-20/11/2005, - 500 US\$). Exhibition: scientific organizations and companies are welcomed to display their activities that pertain to the conference goals. Booth area (2x2.5 m) is available during the conference days for US\$ 200. Duplicates of the booth area are available on request. Contact: The Tethys Geological Society, website: www.tethys.virtualacademia.com. Correspondence: Prof. El Sayed Abd El-Aziz Aly Youssef, Geology Department, Faculty of Science, Cairo University, Giza, Egypt, Fax.: 002 02 5728843 Tel.: 002 02 5676887 - 002 012 2926034, e-mail info@tethys.virtualacademia.com.

Tools of the Trade: Methods, Techniques, and Innovative Approaches in Archaeology, November 10-13, 2005. In recent years, some archaeologists have employed a remarkable array of new tools to better interpret the archaeological record. Others have examined the impacts of new technologies on pre-contact human groups. The objective of this conference is to bring together scholars and students who share these common research interests and who are willing to describe and discuss their innovative approaches to the analysis of archaeological materials and assemblages. Papers and symposia will focus on topics relating to the tools of the trade including, but not limited, to: 1) computer modeling and space syntax as approaches to the study of architecture, 2) remote sensing and GIS applications in archaeology, 3) use-wear and residue analysis of tools, 4) stable isotope analysis and ancient DNA, 5) advances in dating techniques and their application in archaeology, 6) experimental approaches to the study of tools, 7) ethnoarchaeological research on the use of different types of tools, 8) ethological approaches to the study of tool use, 9) archaeometric studies and sourcing of raw

materials, 10) computer simulation and the modeling of past environments, 11) innovative field recovery techniques in archaeology, and 12) advances in geoarchaeology, zooarchaeology, or paleoethnobotany. We also envision discussions on the invention and impact of technology on cultural development. For further conference information please see our website at: <http://www.arky.ucalgary.ca/arky1/Chacmool2005/Main%20'05.htm>.

National Park Service's 2005 Archaeological Prospection Workshop. The National Park Service's 2005 workshop on archaeological prospection techniques entitled Current Archaeological Prospection Advances for Non-Destructive Investigations in the 21st Century will be held May 16-20, 2005, at the Hopewell Culture National Historical Park in Chillicothe, Ohio. Lodging will be in Comfort Inn in Chillicothe, Ohio. This will be the fifteenth year of the workshop dedicated to the use of geophysical, aerial photography, and other remote sensing methods as they apply to the identification, evaluation, conservation, and protection of archaeological resources across this Nation. The workshop this year will focus on the theory of operation, methodology, processing, interpretation, and on-hands use of the equipment in the field. Special topic for this year is the introduction of geophysical techniques in archaeological excavations. In addition to the workshop, there will be an equipment fair on Friday (May 20th) with the major geophysical equipment manufacturers attending. There is a tuition charge of \$475.00. Application forms are available on the Midwest Archeological Center's web page at <http://www.cr.nps.gov/mwac>. For further information, please contact Steven L. DeVore, Archeologist, National Park Service, Midwest Archeological Center, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska 68508-3873, USA: tel: (402) 437-5392, ext. 141; fax: (402) 437-5098; email: steve_de_vore@nps.gov.

National Park Service's Geophysical Equipment Fair. The National Park Service is offering a geophysical equipment and software fair as part of its Current Archaeological Prospection Advances for Non-Destructive Investigations in the 21st Century. The equipment fair is open to all interested parties including Federal and State agency archaeologists, contract archaeologists, university professors and students in the Ohio, Kentucky, Indiana, and Pennsylvania area. Manufacturers and dealers will be showing their latest equipment available for archaeogeophysical investigations. Instruments will include cesium and fluxgate gradiometers, ground penetrating radars, electromagnetic conductivity meters, resistance and resistivity systems, magnetic susceptibility systems, metal detectors, and geophysical processing software. Companies that plan on participating include Advanced Geosciences, Bartington Instruments, Dualem, DW Consulting, GEM Advanced Magnetometers, Geometrics, Geonics Limited, Geophysical Survey Systems Inc, Geoscan Research, LRS Scintrex, and MALÁ GeoScience. The fair will start at 9:00 am and end at 4:00 pm on Friday, May 20th at the Comfort Inn. Don't miss out on this great opportunity. For further information, please contact Steven L. DeVore, Archeologist, National Park

Service, Midwest Archeological Center, Federal Building, Room 474, 100 Centennial Mall North, Lincoln, Nebraska 68508-3873, USA: tel: (402) 437-5392, ext. 141; fax: (402) 437-5098; email: steve_de_vore@nps.gov.

Geoarchaeology Conference. Request for Expressions of Interest Members of the Geoarchaeology Research Group of the University of New Brunswick, Fredericton and Saint John Campuses, are planning to host an international Geoarchaeological conference in eastern Canada on October 22 & 23, 2005. The conference will include oral and poster presentations (in English or French) on Saturday, and a field trip to St. Andrews, N.B. on Sunday. Whether you can come or not, if you are interested please email Pam Dickinson (Pam.Dickinson@unb.ca): we'll put you on our email list and keep you informed. Although we are not asking for firm commitments at this point, please do let us know if you think you can attend, and if you are interested in presenting a poster or paper.

Primer Congreso Argentino de Arqueometria, "Metodologías Científicas Aplicadas al Estudio de los Bienes Culturales: Datación, Caracterización, Prospección, y Conservación," Rosario, Argentina, 20-21 de octubre de 2005. Hacer arqueología en el siglo XXI implica cada vez mas hablar de Carbono 14, dendrocronología, termoluminiscencia, paleomagnetismo, microscopía electrónica, microsonda láser, observaciones con luz infrarroja o ultravioleta, difracción de rayos X, posicionadores satelitales, sensores remotos, bioarqueología, zooarqueología, geoarqueología, metalografía, análisis polínicos, concentración de fosfatos, radiografía, termografía, técnicas estadísticas, informatización, etc.; es decir la aplicación de técnicas analíticas provenientes de las ciencias duras al estudio de los materiales arqueológicos y a sus contextos naturales. El campo de acción de la arqueometria consiste en efectuar diferentes estudios que permiten encuadrar los objetos en su contexto arqueológico e histórico ya que cada artefacto elaborado por el hombre tiene un contenido simbólico y expresivo anclado a un soporte material. Mientras que el estudio del contenido simbólico es competencia del arqueólogo, del historiador, del etnohistoriador; el análisis del soporte material es de interés arqueométrico: Naturaleza de los materiales, proveniencia, cronología, alteraciones, etc., conocimientos necesarios, además, para encarar tareas de conservación y restauración. Los estudios arqueométricos sólo pueden lograr su cometido cuando se encarar como parte de una actividad transdisciplinaria. Integran las actividades de la arqueometría, entre otros, la datación radioisotópica de los materiales provenientes de una excavación arqueológica, el estudio petrogeológico de una talla en piedra o de una cerámica, la estratigrafía de una pintura, el análisis metalográfico de una aleación, el estudio dietario a partir de los materiales óseos de antiguas poblaciones, la determinación de proveniencia de materiales, la autenticación o no de un bien cultural. La realización de este Congreso permitirá conocer y difundir el estado actual de los estudios arqueométricos en el país, exponer los avances alcanzados, ofrecer a los participantes niveles de reflexión y diálogo sobre las diferentes problemáticas y sus

metodologías. Además posibilitará el intercambio de experiencias y la colaboración entre los diferentes equipos de investigación con el objeto de establecer nuevos ámbitos de trabajos interdisciplinarios. Para más información, email: congreso.arqueometria@gmail.com.

5th European Congress on Regional Geoscientific Cartography and Information Systems will be held in Barcelona, Spain, from June 13th to 15th 2006, with the subheading "Earth and Water." The aim is to stimulate the discussion on the integration of Earth Sciences with other disciplines for supporting landscape analysis, a discussion in which geology, water and soil sciences are conveniently related. The objective of the venue is to provide a firm support to the planning of land use at the local, regional and national scale, and to contribute to the definition of the regulations of its use, based on the interaction of land planners and experts on geological, hydrological and environmental disciplines. The Congress will be structured in sessions and in workshops dealing with some special topics. For more information, visit the website: www.icc.es/econgeo2006/home.html.

Australasian Archaeometry Conference, 12th to 15th December 2005. Contributions are now requested for the lecture sessions, poster session, and workshop of this year's Australasian Archaeometry Conference, to be held at the Department of Archaeology and Natural History of the Australian National University, Canberra, Australia from the 12th to the 15th of December. Sessions have been arranged in six sections: Section A. Geoarchaeology, Section B. Biological Science, Section C. Material Science, Section D. Chronology, Section E. Computer applications, Section F. Conservation Science, Section G. General, Section H. Posters. Prospective contributors should contact the session convenors directly (details below). Papers should be limited to 20 minutes in length (excluding question time), unless prior arrangement is made via the convenor with the conference committee. Full audio-visual facilities, including digital projection, will be provided. Prizes of \$200 each will be awarded by the conference for: Best Paper, Best Student Paper and Best Student Poster. To contact any of the conference organisers, email andrew.fairbairn@anu.edu.au or sue.oconnor@anu.edu.au or snailmail to: Department of Archaeology and Natural History, RSPAS, The Australian National University, ACT 0200, Australia. Website: http://car.anu.edu.au/Archaeometry/archaeometry_conference.html.

Standard Radiocarbon Calibration

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Calibrated radiocarbon ages are the basis for comparison between many records in paleoclimatological, geophysical, and

archaeological studies. It is therefore necessary to have a standard radiocarbon calibration curve for intercomparisons to be valid. The radiocarbon community has recognized this need and hence has adopted an international standard for calibration, IntCal04 which was ratified at the 18th International Radiocarbon Conference in Wellington, New Zealand. The importance of the quality of the data set used for calibration cannot be overstated. The IntCal04 working group and the journal *Radiocarbon* is thus pleased to announce the release and publication of IntCal04: Calibration Issue" as a special issue of *Radiocarbon* (v46, n3, 2004). Concurrent with the IntCal04 release and consistent with previous incarnations of IntCal is a revision and update of the calibration software program CALIB. We would like to thank all of the IntCal working group authors, collaborators, reviewers, and the radiocarbon community for participating in this process. Special thanks to the Radiocarbon staff, especially managing editor Mark McClure.

Please visit <http://www.radiocarbon.org> to download IntCal04 and links to internationally standardized and accepted radiocarbon calibration software programs (BCal, CAL25, CALIB, OxCal). The IntCal issue and release of the IntCal04 data sets would not have been possible without the financial assistance of the Leverhulme Trust, and the University of Arizona/Radiocarbon.

Bridging the Gap: Integrating Archaeological Science and Archaeology

*Stacey Lengyel, Statistical Research, Inc., Tucson,
and Amy Margaris, Department of Anthropology,
University of Arizona*

During this year's annual meeting of the Society for American Archaeology in Salt Lake, Utah (USA), the SAS sponsored a forum entitled "Bridging the Gap: Integrating Archaeological Science and Archaeology." The goal of this forum was to bring together practitioners and consumers of archaeological sciences to discuss integrating archaeological sciences within mainstream archaeology and to create an open dialogue between panel and audience members. The following is an abbreviated transcription of the 2.5-hour forum and focuses on several of the main topics of discussion, including: student training, funding, and ways to increase the relevance of archaeological science to the greater community. Panelists included: David Anderson, Doug Price, Paul Goldberg, Greg Hodgins (moderator), Stacey Lengyel, John Yellen, Julie Stein, Rinita Dalan, A.J. Vonarx, Beth Miksa, and Christian Wells.

Training

Panelist 1: So let's open the discussion to training.

Audience: My question is what can we do to continue the integration between subfields and other fields in archaeology?

Because this doesn't seem to be a very common thing in graduate departments around the country.

Panelist 2: I think we do ourselves a disservice by forcing the choice and enforcing the limits. When I talk to members of the public about what I do they think it's really cool, and they don't respond to me as "You're a geologist" or "you're an archaeologist" or "you're a geoarchaeologist" etc., they think what I do is interesting and it doesn't matter to them that the disciplines I studied to get to that point are in two different departments. So it behooves you all to step away from the boxes, the artificial divisions.

Audience: How would you suggest that an undergraduate or beginning graduate student maintain that lack of category if they have to go to a specific department?

Panelist 3: Particularly in undergraduate education, there has to be a course where you put those things together. In our program we have an archaeological prospection course, and I come at geophysics from both an archaeological and a geotechnical perspective when I talk about applications. You're talking about those things in one place and trying to bring those terms together, and the place that you really cement those terms in their use is in one forum, whatever that may be, such as a short course that you take where they come together. Of the students I see, those are the ones who really get it, when you bring it together.

Panelist 4: Emphasis on undergraduate research. Really seek out an environment of research experience, a volunteer experience, an internship experience, that puts you in touch with people doing real research. You'll understand through the research process how different disciplines can be integrated. I think that it's really key to get it early on and not when you arrive to graduate school.

Panelist 5: It isn't just in school. Not being an archaeological scientist, you have to keep working all the time. You've got to keep up; you've got to make a conscious effort to find out what's going on in archaeology itself and in archaeological science. I sit in on courses, but I teach as well. Attend sessions... There's lots of ways, but just always keep with it. Don't get your degree and stop; keep reading and constantly thinking about it.

Panelist 6: If what Rinita says is true, that the best students are the ones who go to the programs that have the person teaching the class that puts it all together, how did the people who are teaching the class get there? Because we never had someone who taught that class. I had a student that I worked with who chose to go to another institution but she coerced me and Paul and other researchers at other universities to get the training she needed. She put that together; that structure wasn't already in place for her.

Panelist 7: I think that when you're an undergraduate looking around for graduate schools there are a number of things you

need to ask yourself. First, to what extent do you know what you want to do, or don't know what you want, or are unsure. You also want to know if you want a big place with lots of people or a smaller place with few people. If you're unsure, go to a bigger place where you have more diversity. My feeling is that there are few graduates who really know what their interests are. If you do know what you want, then there are schools with specialties.

Audience: ...I'm interested to hear from the anthropology faculty about what are your departmental policies or tolerances for getting your students to get some of that harder science background as either Masters or PhD students. Taking those courses in other departments?

Panelist 6: ...I think that the answer to your question is that it depends on you...I firmly believe that students have to take courses outside our department. I also encourage my students, and other students, not to see their own university as the boundary. I have many students come as visiting students to take my geoarch class, from other countries as well as from other states. Why should you go to the University of Washington if you just want a geoarch class?

Panelist 8: That's a good point... and you should also look within your local area. If you're at a school that doesn't offer some of the specialties that you're interested in, but there are other universities nearby that do, you can continue to be a student at your home university but go out and take classes at neighboring schools.

Panelist 3: I think that part of the issue is that when we use these labels we set up some barriers...When you talk about hard sciences versus archaeology, then all of a sudden there's questions about who's better, or who's able to handle this stuff, and ... those words are a barrier to people, because archaeology has this history of feeling kind of bad because we're not as scientific as others

Panelist 1: I think that it's my job to make it clear to people that they can understand what I do; I should be able to make you understand what I do...

Panelist 3: I tell my students over and over take calculus, take physics, but there's this trepidation, ... and it takes a lot of convincing to give them that basis, but you have to do it because they think that that's something separate.

Panelist 6: There's a tendency on the part of us who are more comfortable with these scientific techniques to denigrate those in archaeology...

Panelist 8: I think that there is this tendency among archaeologists to feel inferior to the "hard" sciences... But we're the ones who come up with the questions that are really interesting, and if you bring in a physicist they may be interested only in some little microcosm. We take that data, and we apply

it to people, and we try to get at these bigger questions. What we're doing is just as important, if not more important, than what people outside of archaeology do, and we need to stop having this inferiority complex that we're not as good as they are, or not as smart, or whatever.... I think that it's archaeologists who are setting up these roadblocks.

Panelist 9: After doing this for many years I've come to see that archaeologists don't even know the right questions to ask.

Audience: As an archaeological scientist, do you have to be an expert in the chemistry as well as the archaeology, or is it okay to have a very firm grounding in it? To what degree do you have to be an expert? Because you have a lot of hats to fill to be an archaeologist, and it seems like you have to be an expert in every single science,

Panelist 6: I feel that the answer to that is what Rinita was describing as the vocabulary, the writing format, you have to be able to communicate with them, but you don't have to be an expert, as they are, because if you can get access to the information, or you can motivate them to collaborate with you that's what you need, but in order to motivate them to collaborate, you have to be able to translate between the archaeological jargon and the jargon of that discipline.

Panelist 1: I think that there's a danger, but also a great freedom in not knowing what the questions are in the field, and actually having enough confidence in your own new questions and how you want to ask them. It's just developing the thinking skills to carry your ideas through...

Panelist 5: I have no specialization whatsoever, but I would say that where ever you do archaeology, whether in an anthropology department or archaeological sciences department you really do need to understand at some general level what is going on in all of these areas so that when you're going out digging and running projects you know what the potential is of the archaeological record. If you're a generalist like I am you really have to make a conscious effort to try to keep up... There are a lot of wonderful things we can learn from the archaeological record and we have to know how to do that. So, wherever you go, work with open-minded faculty who are going to let you do science, and when you go out and do archaeology try to bring as many points and do as many techniques as possible that are relevant to your research.

Audience: ...I wondered, well, which is easier to teach... – is it easier to teach an archaeologist chemistry or chemist archaeology?

Panelist 2: I've trained a number of assistants over the years, and I can't say that one or the other is better; it's an individual thing. I'm currently training assistants who have backgrounds in petrology and geology, and I'm finding it to be a long-term project to get them to think in terms of

archaeological questions and be able to apply their training in archaeological ways. It's a unique way of thinking, and getting that background in archaeology is an important thing.

Audience: We need to make sure that people coming to archaeological science from chemistry, physics, etc. understand some of the archaeological questions that are being addressed. On the chemistry side, it's very easy to try to force an artifact to the instrumentation, whereas it's our responsibility from this side of the problem to make the instrumentation work with the problem, rather than to force it to work with one analytical way or another.

Panelist 10: We're doing a good job of training archaeological scientists; I just think there are not enough of us out there. We need more people doing archaeological science, who are role models, and run laboratories that students can walk into and learn what's going on. And we need archaeologists doing this. We need archaeologists asking the questions and archaeologists answering the questions.

Funding

Panelist 1: There's a diversity of funding sources... So, can we open up the discussion about people's funding pressures. How diverse are people? Panel members, how diverse are you in your funding?

Panelist 5: I've been in CRM for years, and I'm used to writing proposals where you write into the budget a whole host of analyses. If you plan in advance to involve people from different areas, in some cases there are very large sums of money available. When you do CRM, you take these things into consideration, and people have for a long time. I think that's a tremendous source of where a lot of the funding is coming from.

Panelist 2: In that sense, my primary source of funding is CRM. And if somebody comes to me early enough in the project that we can incorporate good, answerable questions into their research design, then I have the possibility of providing them something that will help their research, and also further our research. You can't have it all at once, but you can slowly build up the comparative data that you need through CRM projects.

Panelist 6: Federal agencies are another source; it's a very small source, but the National Park Service is often contracting with individuals... I have had a lot of work funded in very small increments on an annual basis. It's a way of cobbling together lots of little monies so that you can do something different.

Panelist 11: For those students and professionals, a great source of funding that's really untapped for the most part is the National Institute of Standards and Technology.

Panelist 3: And also, the National Center for the Preservation of Technology. Also, about funding for graduate

students, when I realized that you could actually get paid to go to graduate school, I kind of went crazy and I actually got funding from a lot of disparate sources... We need to look real broadly even as grad students to find funding.

Panelist 10: I think that we're painting too rosy a picture for folks. There's a lot of money that's not available out there. I've spent a good part of my life, too much of it, trying to scrounge up money to keep the laboratory running and keep it afloat. We are being beaten into the ground by archaeological science going on around the world. There is a lot of money being spent in Britain and EU countries. In this country we're struggling to keep laboratories running, and that should not be the case.

Panelist 6: Why is Britain so much more successful?

Panelist 10: There are a lot of unique funding sources over there. The television programs in Britain have had a huge impact on raising public awareness on a lot of these issues.

Panelist 6: So we need more TV?

Audience: I run my own geoarchaeology firm and I think a lot of the points that you're making are very valid. I think you have to realize that in the United States, private sector runs the operation. If you're looking at Europe or at other countries in the world, there are federally or state-supported science-research endeavors. We don't do that. David Anderson said you can tap into various components of the government and get tremendous amounts of money, but you have to do it by yourself, and you have to understand that there is potential to get funding for specific types of projects. But there's not a state wide or national directive to do that. And I think we have to understand in archaeology, that our system is very different here in the States. We have to do this by ourselves. And if we do that, and people in the private sector know that it can be done, you can get these analyses done. You can actually even in some cases support a federally funded lab to some degree by drawing on private sources for a particular program. You have to sometimes go into agreements with oil companies, with departments of highways and this sort of thing, but it can be done. It's just that there's no national protocol for it.

Increasing Relevance

Audience: I was wondering if the funding issue is a reflection of society's value of archaeology. I know here in Utah it's really seen as an obstruction to progress. How do you fix that? There doesn't seem to be a connection to the value that archaeology has, especially by corporations that see CRM projects as holding them back.

Panelist 6: I agree with you. Why, when we're children, does everyone want to be an archaeologist but then suddenly as a landowner they don't even want to talk about archaeology? I think that we as a discipline, and especially as educators, have a challenge to keep the thrill of archaeology that is in the

general public, and keep from just squashing it and killing it in the classroom... I think that Doug is exactly right about television. Look at what the Antiques Roadshow did for antiques. And History Detectives. I really do think that there's something to capturing that. If we can't communicate it in the universities, the television is going to do it commercially... And I think that science might be the key for capturing some of that attention.

Panelist 5: What I try to do is I want my students to feel good about archaeology. Whatever else they learn, I hope that when they grow up to be citizens, and most of them will have nothing to do with archaeology in later life, but I want them to understand that archaeology is not impeding progress, it's understanding where we came from, or what it means to be human. If you can make them feel good about that, make them understand that, then they'll be better-informed citizens.

Audience: If you want to do the TV, you have to do it well. You have to do science. In England, to often, they have these series, and they present just one opinion, and that's not science. You're not going to interest the public over the long-range if you just present one new idea. You need to show different opinions. That's how you interest the public even more – because they'll say, ah, this is a controversial subject. Like human evolution is controversial. So you have to be scientific, and try to be as objective as possible. Otherwise you're going to risk the goal.

Audience: ... You have to go into an applied situation... You have to train students not just to be pure researchers for the sake of doing research. It has to have applicability if that message is going to spread, not just to the archaeological community, but more importantly to the preservation community. Because that's who's funding us. If you can't make that transition, then it's really always going to be a problem in terms of getting funding. You have to promote the message, and you really have to lay that on the doorstep of the universities. Because they have to transmit that information, otherwise it's really going to be a losing battle.

Panelist 1: Any other comments? I do have to say that the one comment that stuck in my mind the most, was one that Julie Stein made about directional interaction. It really does come down to where interdisciplinary researchers need to be able to communicate. We all need those skills of explaining what we do to others so that they see that it is to their advantage to be creative in coming up with projects and proposals.

Panelist 6: AJ made the comment that you really have to advance both disciplines, and I thought that was a really important comment. John also alluded to it. You need to ask a specialist to come and help you without realizing it. You have to say it in such a way that they can advance their discipline and their question as well as yours, and it really is a collaboration. I think it's a really important thing to do.

Thanks to all participants and the audience!

Sourcing Red Ochres by Instrumental Trace Analysis

Rachel S. Popelka J. David Robertson Michael D. Glascock, and Christophe Descantes, Archaeometry Lab at the University of Missouri Research Reactor Center

Red ochres are ubiquitous on many North American archaeological sites, and are found in cave artwork, mortuary contexts, and other ceremonial milieu. Because of their importance, certain ochre pigments may have been traded for their unique qualities. To date, ochre pigments have not been well characterized by elemental methods. This project analyzes red ochres from several sources, using x-ray fluorescence spectrometry (XRF). Multivariate statistical analyses of the data indicate geochemical trends in the ochre sources that satisfy the provenance postulate.

Archaeological Ochres. Ochres have been used as pigments in several milieu including body pigments, cave pictographs (Diaz-Granados 2000), mortuary contexts and others (Mrzlack 2003). Culturally, ochres' deep red color has deep associations with blood and death (Mrzlack 2003). Erlandson et al. in 1999 described the particle induced x-ray emission (PIXE) analysis of eight ochre sources from western North America (Erlandson et al. 1999). This paper provides the framework for this study. Mrzlack (2003) published a thesis concerning the PIXE analysis of several ochre artifacts from a cave site in Alaska. While the preceding studies have begun to characterize ochres, there has not been extensive characterization of multiple sites using elemental methods.

Ochres are composed of two main forms of iron oxide mixed with clays, silicate materials and other admixed surrounding minerals. Red ochres are the most common, and are made up of the mineral hematite (Fe_2O_3). This material is a universal pigment in paintings as well as a colorant for ceramic materials. Yellow ochres (goethite or limonite) have the chemical formula $\text{FeO}(\text{OH})$. Hematite and goethite are found worldwide.

Defining Ochre Sources. Samples were selected for this study from with several goals in mind. Some samples are from known sources, others are artifacts, and yet others were collected to define sources. Samples included from the Erlandson et al. study were collected from known sources in the west (California) (Erlandson 1999). Samples included from the Mrzlack study in Alaska were ochre artifacts collected from a cave context (Mrzlack 2003). Popelka and Descantes systematically collected the Missouri samples from known abandoned iron mines in southeastern Missouri on Mark Twain National Forest property in 2004. These were collected to help define the possible geochemical distinctions between locations in Missouri. By characterizing sources and artifacts, a "fingerprint" of the original source can be determined. This also reinforces the provenance postulate that states that inter-source variation is greater than intra-source variation (Glascock 1992; Weigand et al. 1977). A fundamental question to this

study is: Are sources geochemically different or are the mechanisms for ochre production the driving factor? Once the sources and geochemistry of ochres and/or iron oxides are better understood, conclusions about artifact mobility and artifact exchange in ancient cultures can be drawn.

Analytical Methods. The ochre samples used in this study were characterized x-ray fluorescence spectrometry (XRF). Standards used in this project were Ohio Red Clay, NIST 2689 (Coal Fly Ash) and NIST 690 (Iron Ore Canada). Samples and standards were analyzed at the University of Missouri Research Reactor (MURR). The XRF measurements were completed on a Spectro-XLab 2000 instrument, (Spectro) using the TQ-2275 method.

Data Analysis. The ratio of a given element to Fe helps correct for varying amounts of Fe in each ochre that can influence the concentration of trace elements. For example, in an ochre that contains 60% Fe, the relative concentration of a trace element such as La could be misinterpreted as being smaller than in reality. Ochre from another source could be diluted with clays, making the Fe concentration smaller (e.g. 30%), and the La concentration would be disproportionately higher. These effects could lead to erroneous multivariate statistical errors, making two geochemically similar samples appear to be different. A statistical comparison of the XRF data was performed using principal components analysis (PCA) using the GAUSS software developed by Glascock (1992) and Neff (1994) (with additions by William Grimm 2004).

Figure 1 displays the PCA analysis of all of the Missouri ochres. For this data set, the results are presented as a ratio to

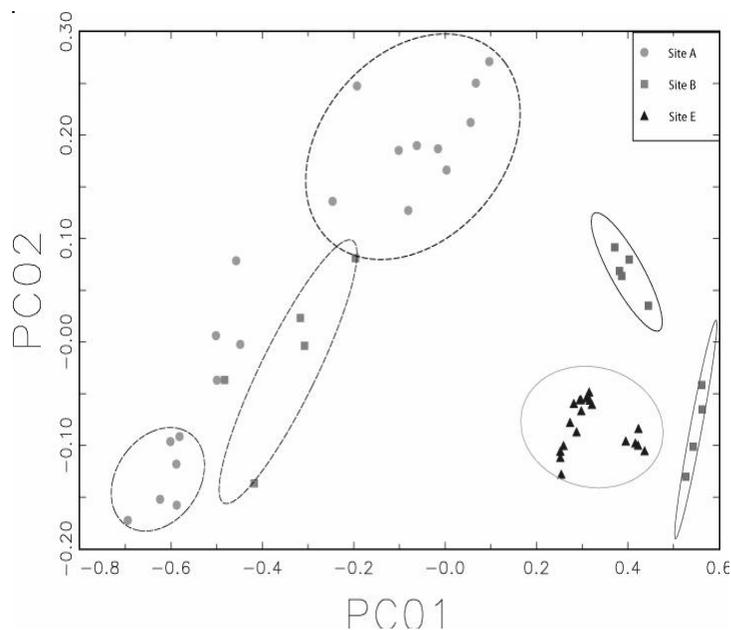


Figure 1: Plot of principal component 2 (PC02) vs. principal component 1 (PC01) showing the statistical distribution of Missouri ochres. Confidence ellipses are 90% (solid line) and suggested groupings (dashed line) are arbitrary.

Fe. In this case, the elements driving the majority of the variance include Si, Cl, Ca and Rb. Another point of interest is that elements from the same groups on the periodic table are strongly correlated. An example of this is Ba and Sr, both in Group II of the periodic table. This result suggests that elements of similar characteristics respond in similar ways geochemically in ochres. It can be seen that samples from Site E cluster very closely together. These 20 samples were collected from a road cut, and all 20 were taken very close to each other (within meters of each other). This suggests that variation within the site is small. In contrast, examples from Site B are in three distinct clusters. However, the sampling areas were very different (a field, a historic mine, a hill wash), and were taken tens of meters apart. On the other hand, the five samples taken per location (sampled in close proximity) group are very closely together. In this case, the sampling locations could be very different from each other in the same site due to weathering and other diagenetic processes. In the case of Site A, the samples are quite spread out. This can be attributed to significant site disturbance from decades of mining at the site. Mine tailings and hematite most likely were moved significant distances from the original geological location as well as intermixed with other materials. Yet, Site A is distinct from Site E and B, as it is geographically.

Figures 2 and 3 show the combined data set of Missouri and California and Alaska ochres. Again, values are expressed as a ratio to Fe. Similarly to the Missouri set, elements such as Cl, Ca, and Mg drive the variance. Other transition metals and lanthanides also contribute to the variance. Elements and vector direction are similar for both the Missouri and the concatenated Missouri and U.S. data sets, suggesting that based on XRF data, these are the elements that can characterize ochres.

Conclusion. Through trace elemental analysis of ochre samples, sources and patterns can be found through multivariate

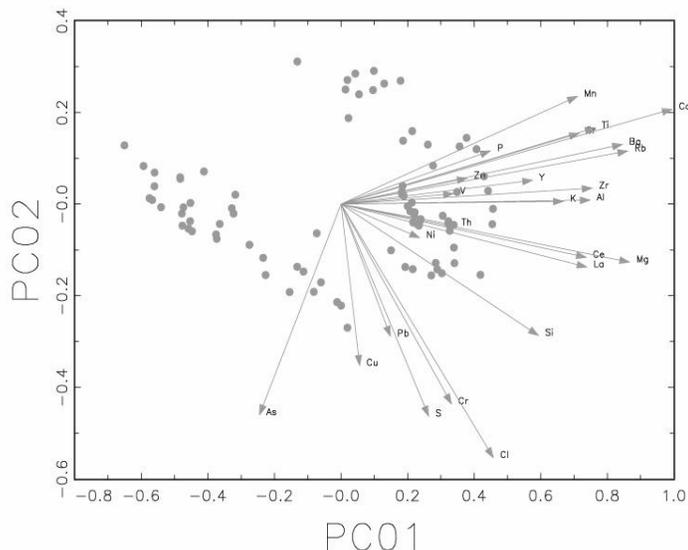


Figure 2: Plot of principal component 2 (PC02) vs. principal component 1 (PC01) showing the statistical distribution of United States ochres and the elemental vectors driving the variance.

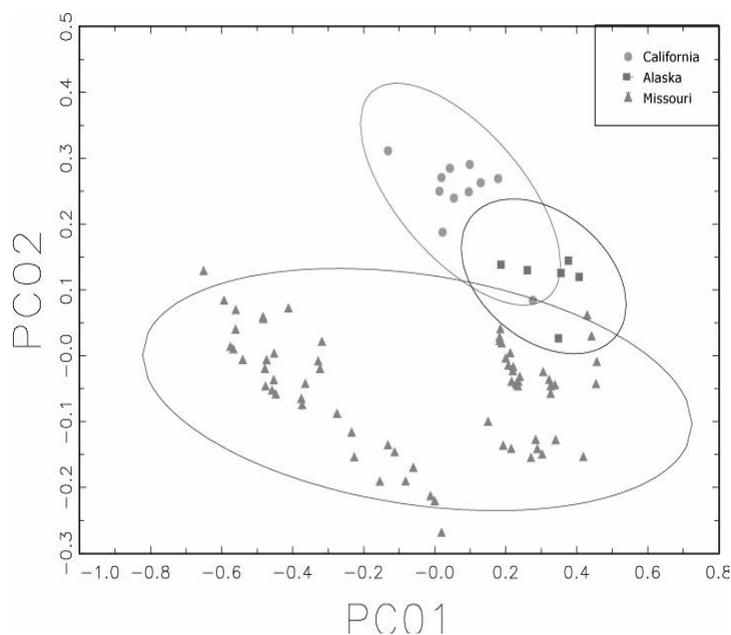


Figure 3: Plot of principal component 2 (PC02) vs. principal component 1 (PC01) showing the statistical distribution of United States ochres. Confidence ellipses are 90%.

statistics. A sample set from Missouri and also from two other United States sources were analyzed by XRF. Through multivariate analysis, it was found that the provenance postulate also applies to ochres, although the groups are not a well defined as for other archaeological materials. However, a clustering of samples can identify small geographically limited groups. This project lays a framework for further archaeological ochre characterization and study, ultimately leading to the study of pigments and artifacts.

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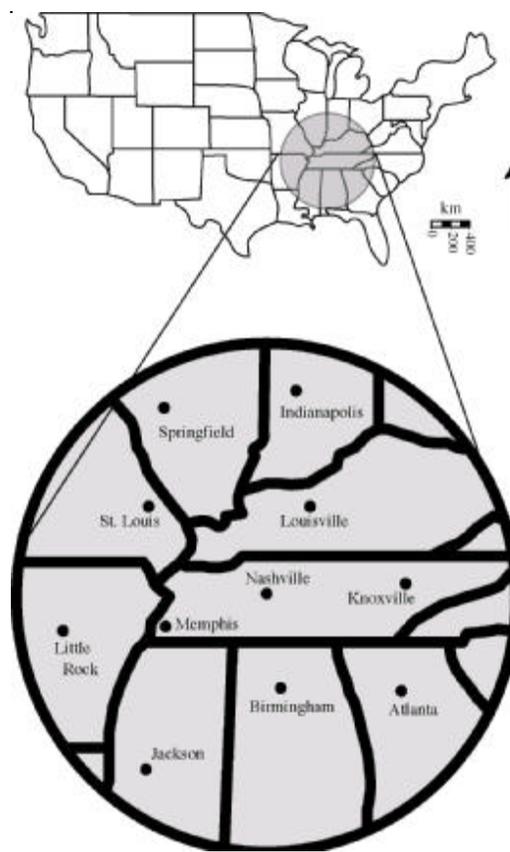


Figure 1. Location of the project area within the U.S. mid-continent. The states featured in the inset include Missouri, Illinois, Indiana, Kentucky, Tennessee, Arkansas, Mississippi, Alabama, and Georgia. The data were collected over the past 35 years from 41 archaeological sites located within this region.

Archaeomagnetic Research in the U.S. Midcontinent

Stacey Lengyel, *Statistical Research, Inc., Tucson*

Recently, an archaeomagnetic reference curve (MCCV04) has been developed for the U.S. midcontinent (Figure 1) that indicates the average path of secular variation for this area over much of the Holocene (Lengyel 2004). This curve is based on archaeomagnetic and independent chronometric data (e.g., radiocarbon, historic records, and diagnostic artifacts) obtained from 240 archaeological features that have been dated as early as 10,700 cal BP. These data were collected over the past 35 years from 41 archaeological sites located within the region bounded by central Arkansas, southern Ohio, western North Carolina and southern Alabama. The resultant curve can be used to date the last time that archaeological features in this region, such as hearths, earth ovens, kilns or structure floors, were heated to relatively high temperatures (e.g., the last use event or destruction event).

Archaeomagnetic dating depends on two related phenomena. First, the earth's magnetic field changes in direction and strength on the order of decades. This is called secular

variation and is often depicted as changes in the position of the north magnetic pole around the geographic rotation axis. Second, burned, clay-rich archaeological features, such as cooking hearths, accurately record the direction of the magnetic field at the time they were last fired (Figure 2). This is because the clay soils used to construct archaeological features typically contain ferromagnetic minerals (e.g., magnetite and hematite). When heated to several hundred degrees centigrade, the crystalline structures of the minerals relax, allowing the magnetic moment carried by each grain to align with the prevailing magnetic field. This alignment is locked in when the minerals are cooled to ambient temperatures. If the minerals are subsequently reheated to a similarly high (or higher) temperature and then cooled back down (e.g., reusing a hearth), the previous magnetic moment will be replaced with one that reflects the contemporary magnetic field. Thus, the remnant magnetism measured in the laboratory typically reflects the last use of the feature. By comparing the magnetic direction recovered from an archaeological feature of unknown age to an archaeomagnetic reference curve, researchers can determine when that magnetic signal was acquired.

Archaeomagnetic reference curves are compiled from regional sets of independently dated archaeomagnetic data. The dataset used in this project included archaeomagnetic directional data collected from 240 archaeological features at 41 sites between 31.5-40.5° N latitude and 82.5-93.5° W longitude. These data were independently dated and had 95 percent ovals of confidence of less than or equal to 4.0 degrees. Archaeomagnetic data used in secular variation reconstructions



Figure 2. The author collecting an archaeomagnetic sample in Tennessee.

must be calibrated by independent dating techniques because they are directional data and, so, are inherently spatial, rather than temporal, in nature. AMS dates and historic records were used to calibrate the dataset whenever possible; however, much of the archaeomagnetic data collected in the 1970s and 1980s could be dated only through diagnostic materials or, in some cases, stratigraphy. The latter was particularly true for archaeomagnetic data collected from Early and Middle Archaic contexts, and so much of the early data had very large independent date ranges.

In this project, the archaeomagnetic dataset was smoothed via averaging windows (Sternberg and McGuire 1990) to form the preliminary approximation of the regional secular variation curve. As is the convention in the U.S., the directional data were converted first to virtual geomagnetic poles (VGPs) to reduce the scatter effect that is introduced over large geographic regions. A VGP is simply the location of the magnetic north pole that would have produced the magnetic field direction recorded by a given archaeological feature. These independently dated VGPs were averaged over incremental windows of time shifted at set intervals to form a series of weighted, mean VGPs. For instance, all of the VGPs with independent date ranges that overlapped the 630-410 BP window were weighted by their respective temporal overlap with that window and then averaged to form the 520 BP mean VGP. Due to the nature of the window size and interval, all of these data contributed to the preceding and/or succeeding mean VGP as well.

The resulting curve (MCCV04) was then refined and tested through three procedures (Figures 3 and 4). First, outlier analyses were conducted to identify and remove aberrant sample directions from the dataset. I used a 3-standard deviation outlier test to identify data that were more than three standard deviations from mean VGPs for averaging windows that they overlapped. VGPs that failed this test for each relevant window

were considered to be outliers. A total of 15 outliers were identified; however, only two were removed from the final dataset. This is because 13 of the outliers intersected large averaging windows (e.g., 600-900 year windows) and, thus, could reflect underrepresented populations of directions.

Next, the MCCV04 declination and inclination trends were compared to those of eight secular variation records from across the U.S. These included the Southwest archaeomagnetic record, Holocene-aged lava flows from the western U.S., and Holocene-aged lake sediments from Oregon (Fish Lake), Minnesota (Elk Lake, Kylene Lake, and Lake St. Croix) and western Pennsylvania (Sandy Lake and Lake LeBeouf). The correlation between these records indicated that there is very good agreement between the midcontinent record and the other secular variation records for the last 2500 years, including an inclination low at around 1000 BP and a westward swing in declination at around 2000 BP. However, the earlier portion of MCCV04 is much flatter than the other records and is out of phase in some places, most likely due to the larger date ranges and smaller data densities incorporated into the earlier mean VGPs. Additionally, while the inclination records are very similar for 1300-1000 BP, the MCCV04 declination record appears to be somewhat out of phase during this period; this could reflect the smaller amount of data included in these VGPs.

Finally, pairwise statistical comparisons were made within the curve dataset. Essentially, this involved using a series of significance tests (McFadden and Lowes 1981) to identify pairs of statistically similar directions. Because these tests were conducted without reference to independent dates, they provided a way to ascertain the validity of the date-dependent mean VGPs. For the most part, individual VGPs that grouped together temporally also agreed with each other spatially. However, a few of the averaging windows intersected statistically distinct sample VGPs. Most notably, the 1290-1070 BP averaging window grouped together a spatially disparate set of VGPs that had similar independent dates. The resulting 1180 BP mean VGP was the only one from this segment of the curve that was markedly different from other regional secular variation curves. Further analysis indicated that several of the VGPs probably dated to the later part of their independent date ranges and therefore should not have been averaged into the 1180 BP mean VGP. When the mean VGP was recalculated without these younger VGPs, the new location brought the shape of the midcontinent curve into agreement with the rest of the secular variation curves at this time. This new mean VGP is labeled the 1180 alternate VGP and is a hypothesis that should be tested with future data.

Other alternate mean VGPs were calculated for the early segment of the curve, which utilized long averaging windows to accommodate the large independent date ranges. The pairwise statistical comparisons indicated that virtually all of these windows intersected numerous, temporally distinct VGPs, but without better independent dates, it was impossible to quantify how these distinct VGPs related to each other. Instead, possible alternatives to the original mean VGPs were calculated

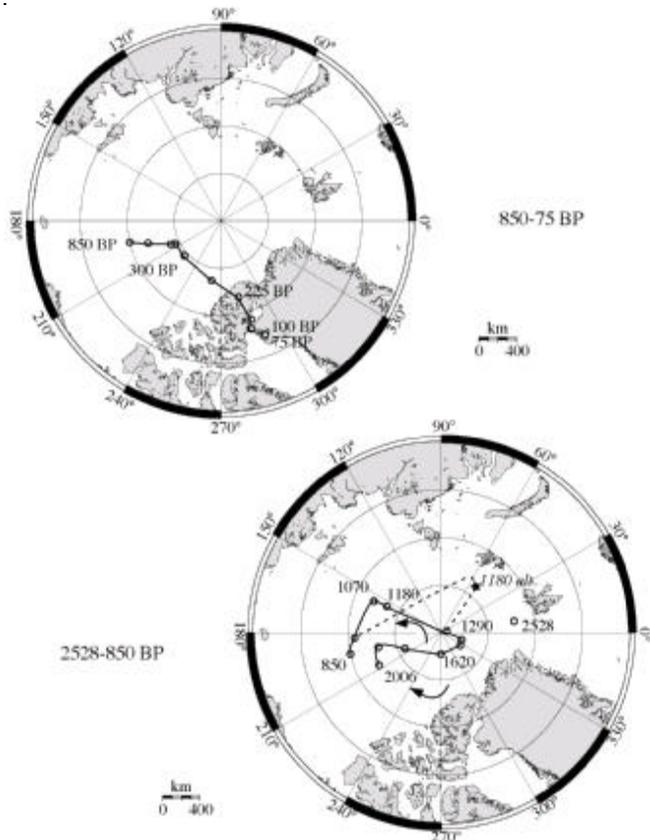


Figure 3. The late and middle segments (solid line) and alternate middle segment (dashed line) of MCCV04.

and their validity will need to be tested through the addition of new, well-dated archaeomagnetic data.

Overall, these analyses indicate that the final curve should be treated as three distinct segments with different precisions and use recommendations. The divisions between these segments are based on natural breaks in the data and noted differences from other regional records. First, the 850-75 cal BP segment can be used to date archaeomagnetic samples from the project area with expected temporal precision of 100-200 years. Second, the 2528-850 cal BP segment can be used to date archaeomagnetic samples with an expected temporal precision of 200-300 years. However, the resultant date ranges should be used somewhat cautiously given this segment's deviation from other regional records. It is recommended that this segment be used primarily for relative dating purposes until its shape is either confirmed or modified through additional data. Third, the 9755-4650 cal BP segment should be used for contextual dating purposes only, in that an undated sample can be put into a regional context through comparison with the segment's constituent samples. In this way, features incorporated into the curve database can be identified that are earlier or later than an undated feature, allowing a given target event (e.g., feature abandonment) to be analyzed within a diachronic regional framework.

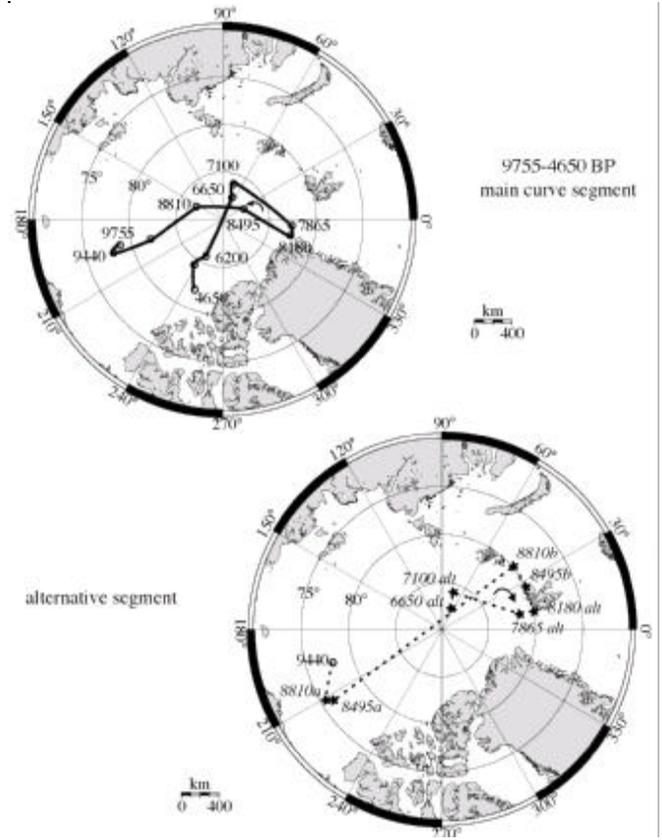


Figure 4. The main (solid) and alternate (dashed) early segments of MCCV04.

Future work will focus on refining these curve segments through the addition of large numbers of well-dated archaeomagnetic data. Furthermore, sampling efforts will focus on underrepresented parts of the project area, including Kentucky, southern Alabama and Louisiana. This can be accomplished by increasing the number of trained collectors working in this region and continuing to educate the midcontinent archaeological community about both the benefits and limitations of archaeomagnetic research, as well as the different applications of archaeomagnetic data (e.g., thermal studies that address behavioral and site formation questions).

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http://ehlt.flinders.edu.au/wac/site/confer_nz2005.php for more information.

Symposia and Conferences

The 2005 UK Archaeological Science Conference took place April 13-16 at the University of Bradford. The theme of the conference was Archaeology at the Interface. Sessions upon the theme included "The Life Cycle of the Artefact" chaired by Ben Stern, "Diet and Diversity" chaired by Holger Schutkowski, "Locality and Movement" chaired by Janet Montgomery, "Archaeology and Forensic Investigation" chaired by Andrew Wilson, and "People and Geo-Landscapes" chaired by Armin Schmidt. "Niah Cave" chaired by Graeme Barker and "How a City Worked: the Urban Community at Pompeii" chaired by Rick James looked at two sites of particular interest.

Archaeological Chemistry

Nora Reber, Associate Editor

Once again, this is a quick round-up of things to look forward to and interesting events in archaeological chemistry. If you have anything you would like included in future columns, please contact me at reber@uncw.edu.

Upcoming

The International Symposium on Archaeometry will take place May 10-15 in Beijing, China. It is much too late to register, but the next one will be in Quebec City, Canada May 2-6, 2006. Registration deadlines have not yet been posted.

The 17th British Organic Geochemical Society (BOGS) meeting will take place July 14-15 at the University of Liverpool. This is usually an extremely relaxed and fun conference, for anyone who is interested in organic geochemistry. Further information, including a registration form, is online at http://pcwww.liv.ac.uk/ocean/org_geochem/BOGS2005/index.html.

Papers are being solicited for the Australasian Archaeometry Conference 2005, which will take place December 12-15 at the Australian National University in Canberra. Sessions will be organized along the topics of geoarchaeology, biological science, material science, chronology, computer applications, conservation science, and general studies in archaeological science. Full details will be posted on the conference website http://car.anu.edu.au/Archaeometry/archaeometry_conference.html by the end of May; until that time, contact Dr. Andrew Fairbairn and Dr Sue O'Connor of ANU for more information.

The World Archaeological Conference Inter-Congress on the uses and abuses of archaeology for indigenous populations at Rangataua, Tauranga, Aotearoa/New Zealand is taking place November 8-12. Abstracts will be accepted until August 1 of this year. This seems to be a good opportunity for archaeological scientists to discuss the impacts our research has upon indigenous people with some of those people, as the inter-congress takes place by invitation of the tribes of Tauranga Moana, Ngaiterangi, Ngati Ranginui and Ngati Pukenga. See

The Society for American Archeology meeting at Salt Lake City, Utah this year included the two sessions on pottery residues organized by Hans Bernard and Jelmer Eerkens mentioned in my last column. The event went off very well, and the proceedings will be published as a British Archaeological Report. For results of a blind round-robin experiment comparing analyses of the same mystery sherd from several different labs, see that issue, or visit <http://www.archbase.org/residue/results.html>. Papers were presented on the theory of residue analysis by Hans Barnard of UC Los Angeles; Jim Cassidy of UC Santa Barbara; Marlize Lombard and Lyn Wadley of the Natal Museum; Robert Lusteck of the University of Minnesota; Sean Rafferty of the University of Albany; and Eleanora Reber of UNC Wilmington. Papers on practice in residue analysis were presented by Jelmer Eerkens of UC Davis; Dana Beehr and Stan Ambrose, of the University of Illinois at Urbana-Champaign; Marcus Forster, Carl Heron, Ben Stern, Oliver Craig, and Søren Andersen of the University of Bradford, the University of Rome, and the National Museum of Denmark; Michael Gregg, of the University of Toronto; Hanneke Hoekman-Sites, of Florida State University; Mary Malainey, of Brandon University; and Micala Rider, Paul Fish, William Longacre, Matthew Young, and Mark Malcomson of the University of Arizona. Also at the SAA were many presentations on archaeological chemistry blended with general archaeology symposia. This seems to be an important sign of the acceptance of archaeological chemistry into general archaeology.

Looking back in time, I didn't cover three archaeological chemistry high points in 2004, so here they are. The 36th Central Regional Meeting of the American Chemical Society was held June 2-4, 2004 in Indianapolis, IN. A session, organized by Patricia Lang of Ball State University, titled "Chemistry, Art, and Archaeology" was held on June 3. Talks included analyses of artistic and historical documents, such as "The Scientific Examination of the Sanders Portrait of Shakespeare," by Marie-Claude Corbeil and "The Vinland Map- Sampling and Analysis," by Anna S. Teetsov and Joseph G. Barabe. Rock art, always a popular topic, was discussed by Ruth Ann Armitage and Sarah Fezzy in "Characterization of Black Deposit Associated with

Rock Paintings in Little Lost River Cave, Idaho using Pyrolysis GC/MS.” Coin analysis was represented by “Chemical Compositions of Various Copper-based Coins and Trade Items of China, Japan, Viet Nam and Africa,” by Mark A. Benvenuto, textile analysis by “Archaeological Textiles: Evidence of Human Activity and Thought,” by Kathryn A Jakes, “Characterization of Bricks And Tiles From 17th-Century Maryland,” by Ruth Ann Armitage, Silas D. Hurry and Leah Minc, and soil analysis by “Re-Analysis of Archived Archaeological Soils,” by Daniel Fraser, Ruth Ann Armitage, and Silas D. Hurry.

The first Archaeological Sciences of the Americas symposium took place in Tucson, Arizona September 22-25, 2004. This event is intended to encourage regular and sustained collaboration between archaeologists, conservation scientists, natural scientists, and contract researchers engaged in the development of archaeological science in the Americas, and was hosted by graduate students from the IGERT (Integrative Graduate Education and Research Traineeship) Program of the National Science Foundation.

The 2004 Anachem/Society for Applied Spectroscopy Symposium was held on November 8, 2004 at Burton Manor in Livonia, Michigan, which is primarily meant for analytical chemists. However, five presentations of interest to archaeological scientists were included in the program, three by members of Dr. Ruth Ann Armitage’s group at the Department of Chemistry at Eastern Michigan University in Ypsilanti, and two by students of Dr. Mark Benvenuto in the Department of Chemistry and Biochemistry at the University of Detroit Mercy. “Depth Profiling and X-ray Photoelectron Spectroscopy Analysis of a Black Deposit Associated with Rock Paintings in Little Lost River Cave, Idaho,” by Reshmi Perumplavil, Ruth Ann Armitage, and Simon Garrett won the Anachem Award for Best Student Presentation.

Journals and Books

The most recent issue of *Mediterranean Archaeology and Archaeometry* (4:2) includes a series of articles on obsidian hydration dating that might be of interest to anyone trying to fully understand this useful technique.

Grauballe Man: A Well-Preserved Iron Age Bog Body edited by Pauline Asingh is due to come out on July 1 of this year. It includes reports on X-rays, CAT scans and other analyses underwent by the famous bog body, as well as many color photographs.

For anyone interested in laser-ablation ICP-MS, a new and exciting book on the subject was published on April 1. *Laser Ablation-ICP-MS in Archaeological Research*, edited by Robert J. Speakman and Hector Neff, is a serious reference for this useful type of analysis, including 15 chapters by different authors on the topic.

If anyone has been waiting for Brothwell and Pollard’s comprehensive but expensive *Handbook of Archaeological*

Sciences to appear at the local used book store, your wait is over. An affordable (for an archaeological science book) paperback edition appeared on January 21.

My light reading recommendation this time around is not all that light—the long-awaited second edition of *On Food and Cooking: The Science and Lore of the Kitchen* by Harold McGhee arrived in late November, 2004. Although aimed at cooks and amateur food chemists, this book covers a wide range of food and protein chemistry written in an accessible fashion and with really excellent illustrations. Added bonuses are the historical selections and recipes—do NOT attempt to make the fizzy mead recipe to 1600s specifications—yeast has grown much stronger since then, and cleaning mead off the ceiling is harder than you might think!

Correction

In my last column, I described Dr. Jacqueline Olin’s presentation at the Edelstein Award Symposium for Dr. Joseph Lambert. Her talk concerned the Vinland map, and NOT the Vindolanda map. My apologies to everyone, and thanks to Dr. Olin for pointing this out, and sending me some interesting information on this research.

Archaeological Prospection and Satellite Remote Sensing

Apostolos Sarris, Associate Editor

8th US/ICOMOS International Symposium on Heritage Interpretation. US/ICOMOS has added a new session to the upcoming international symposium on Heritage Interpretation, dealing with Geophysical Technologies in Cultural Resource Preservation. The session is scheduled for the morning of Friday, May 6, in Charleston, South Carolina and it is available to anyone who registers for the US/ICOMOS Symposium (May 5-8, 2005). The session will present a brief history of the geophysical remote sensing technologies, describe some of the most promising applications of them, and consider the ways in which they might be made more available to researchers and preservationists. A discussion will be held at the end of the session to solicit ideas for mainstreaming the use of these technologies in research, site management planning and monitoring the condition of cultural resources. The discussion will also address the need to safeguard the locations of sites when they are discovered with the use of remote sensing technologies. According to the preliminary schedule the following papers will be presented: Cutting Edge to Standard Practice: How Do We Get There? by D. Berwick, Imaging Radar Data and Detection of Archaeological Sites by R. Blom, History and Status of Aerial and Satellite Remote Sensing and GIS in the Inventory and Evaluation of Cultural Sites by D. Comer, Case Studies for Use of Remote Sensing Technologies for the Accurate Recording of Complex Historic Buildings by

C. Gray, Using GIS to Assess Preservation Legislation by J. Knoerl, Data Fusion of Archaeological Remote Sensing from Ground-, Air-, and Space-Based Platforms by K. Kvamme, Application of Ground-Based LIDAR and Other Innovative Photogrammetric Methods to the Documentation and Interpretation of Historic Structures and Archeological Sites by F. Limp. A list of speakers, abstracts, and speaker bios for this session can be found at: http://www.icomos.org/usicomos/Symposium/2005_Symposium_ICAHM_Session.htm or by a direct link at www.icomos.org/usicomos.

Workshop 10 “Archäologie & Computer”: **International Congress “World Cultural Heritage and New Technologies.”** The 10th Workshop on “Archaeology and Computers” (International Congress “World Cultural Heritage and New Technologies”) is planned for the period of 7th -10th November, 2005 at Vienna, Austria, City Hall, Wappensaalgruppe. The Workshop on Archaeology and Computers was founded in 1996 by the Vienna Research Society on Urban Archaeology, the Urban Archaeology Division of Municipal Department 7 (Cultural Affairs), and Municipal Department 14 (Automated Electronic Data Processing, Information and Communications Technologies). Since then the workshop has been held in Vienna in autumn every year. In addition to archaeologists, the workshop soon attracted experts from many other fields and various countries in Europe, such as computer specialists, public sector representatives from municipal institutions and private sector representatives. The specific conference will address problems related to the usage of computers by archaeologist, the development of archaeological oriented computer applications and the lack of co-ordination and co-operation between the experts in the above fields. The main topics of the conference include “Past “ Present “ Future in The Field of Cultural Heritage and New Technologies” and “Cultural Heritage “ (documentation “ presentation “ preservation)”. A number of workshops will also be organized: “Boulevard of Broken Dreams?” Will challenge former (and new) contributors to reflect on their innovations during these past years. The workshop will focus on the usefulness of specific computer and technological applications in achieving their initial goals. “Past “ Present “ Future in Practice” will have a critical look on the advantages and disadvantages of new technologies (including digitization, Virtual reality, photogrammetry, etc), their expectations and future goals. “How to Publish ‘Old’ Excavations with New Technologies” will explore the way that digital technologies may be used to publish and analyse old or unpublished excavation results. The call for papers is already open having a deadline for 20th May 2005. More information regarding the conference can be found at: <http://www.stadtarchaeologie.at/>.

Geoarchaeology Conference: Request for Expressions of Interest. Members of the Geoarchaeology Research Group of the University of New Brunswick, Fredericton and Saint John Campuses, are planning to host an international Geoarchaeological conference in eastern Canada on October 22 & 23, 2005. The conference will include oral and poster presentations (in English or French) on Saturday,

and a field trip to St. Andrews, N.B. on Sunday. Expressions of interest to participate in the conference can be forwarded to Pam Dickinson (Pam.Dickinson@unb.ca).

Computer Applications in Archaeology (CAA2005) – The World in Your Eyes. The CAA2005 International Conference took place at Tomar, Portugal on 21-24 March 2005. Sessions included topics on geophysical prospection, GIS applications, Predictive modelling, 3D reconstructions, Museum and Public Archaeology applications, Internet publications, photogrammetric recordings, archaeological documentation, standards and Artificial Intelligence. GIS presentations included applications dealing with the Roman Period road network of Crete (M. Elvanidou), the archaeology of wine in Crete (K. Athanasaki), the settlement pattern analysis of Ikaria island in Greece (S. Topouzi), the management of archaeological data from Rosia Montana in Romania (D. Mihai, R. Mudura, C. Bors & I. Baltean), the application of hierarchical multi-view representation of spatial data from Corsican Neolithic tombs (E. H. Khoumeri), the study of the spatial dynamics of the Venetian occupation period of Merabello, E. Crete (M. Katifori), the construction of an Information tool and Virtual Memorial Database for graveyards –e-MEM (H. Johannson, M. Felicori, C. Borgatti, S. Caraceni, A. Vysniaukiene, I. Baliulyte, S. Zabiela, A. Sarris, E. Peraki), the analysis of travel routes in the Iron Age island environment of Orkney, N. Scotland (R. Rahn), network analysis and landscape stratigraphy (J. Pouncett), the construction of communicative maps (H. Corley), urban archaeology of the city of Tarragota, Spain (I. Fiz), the study of Daunian settlement patterns in the pre-Roman Age (B. Pecere), visibility and pathways analysis in the Arctic Zones (H. Blankholm), visibility study of the Iron Gates gorge in Serbia (K. Fernie), the visual structure of topography in the Genil river valley, Andalusia, Spain (M. Zamora), the study of the FLK Zinjanthropus floor at Olduvai gorge, Tanzania (M. Causey), the analysis of stratigraphic and remote sensing data in Sesto Fiorentino Plain, Florence, Italy (P. Giovanna) and the study of hunter-gatherers adaptive strategies in northeastern Italian Alps (F. Cavulli and S. Grimaldi).

From the predictive modelling aspect, two papers were presented, dealing with the cost surface analysis for the reconstruction of the ancient road network in the territory of Protohistorical Tarquinia, South Etruria (G. Pelfer) and the Bronze Age settlement model at Northern Apennines valley (M. Tremari).

Remote Sensing presentations included the application of geophysical techniques from Magura Uroiului, Romania (A. Balos, A. Ardeu, R. Stancencu and C. Suteu), the combination of GIS and geophysical techniques for the study of the ancient topography and settlement patterns of Palaepaphos, Cyprus (G. Stamatis, A. Sarris, N. Papadopoulos, E. Kokkinou, S. Topouzi, E. Kokkinaki, E. Moissi, M. Iakovou, V. Kassianidou, G. Papassavas, G. Papantoniou, M. Dikomitou and St. Stylianidis), the processing of Geophysical data through data fusion techniques (E. Ernenwein and K. Kvamme), the application of geophysical techniques for 3D reconstruction of

a 19th century Maori village at Te Horopuriri, New Zealand (R. Gibb, S. Holdaway, D. McCurdy) and the Multidisciplinary approach (geophysical, geological, geological) to the Industrial Sites of the Vrokastro Region of Mirabello, E. Crete (A. Sarris, K. Kouriati, E. Kokkinou, E. Aedona, L. Karagianni, G. Vargemezis, G. Stamatias, M. Elvanidou, E. Katifori, M. Kaskanioti, S. Soetens, Th. Kalpaxis, Y. Bassiakos, C. Athanassas, B. Hayden and T. Brennan).

Finally, a number of important applications dealing with Lidar has been presented, stressing its usefulness in site prediction in the Netherlands through pattern recognition techniques (A. de Boer), the construction of high resolution DTM used by the Ordnance Survey of Baden-Wurttemberg (S. Schmidt, J. Bofinger, R. Keller and S. Kurz) and the assessment of ancient landscapes under forests (construction of 3D models of ridge and furrow in the upper Rhine valley) (B. Sittler and M. Daeffler).

Detailed abstracts of the presented papers and posters can be found at www.caa2005.ipt.pt. The next CAA conference (Digital Discovery: Exploring New Frontiers in Human Heritage) will be hosted by the North Dakota State University and the Archaeology Technologies Laboratory at Fargo, N.D., U.S.A., on April 18-23, 2006. More information can be obtained at <http://www.caa2006.org>.

Archaeological Ceramics

Charles Kolb, Associate Editor



The column in this issue includes six topics: 1) Reviews of Books on Archaeological Ceramics; 2) Previous Meetings; 3) Forthcoming Meetings; 4) Call for Papers; 5) Field Opportunity; 6) Statuses of Four Ceramic Newsletters; 7) Exhibitions; 8) Other News.

Reviews of Books on Archaeological Ceramics

Greek and Roman Technology: A Sourcebook: Annotated Translations of Greek and Latin Texts and Documents by John W. Humphrey, John P. Oleson, and Andrew N. Sherwood (London and New York: Routledge, 1998, xxiv + 648 pp.) [currently available as an eBook ISBN: 0-203-41325-3, \$55.95 from Taylor and Francis eBookstore <http://www.wbookstore.tandf.co.uk/html/>]. The contributions contained in the 13 chapters that comprise this book are translated and annotated key passages from ancient authors that provide a history and an analysis of the origins and development of technology. This sourcebook presents 150

ancient authors and a diverse range of literary genres, such as, the encyclopedic *Natural Histories* of Pliny the Elder, the poetry of Homer and Hesiod, the philosophy of Plato, Aristotle and Lucretius and the agricultural treatise of Varro. The volume also contains glossaries of technological terminology, indices of authors and subjects, introductions outlining the general significance of the evidence, notes to explain the specific details, and a recent bibliography. The Introduction has four parts: Introduction: A. Society and Technology in Antiquity; B. The Literary Sources on Ancient Technology; C. Archaeology as a Source for the History of Ancient Technology; and D. Glossary of Weights, Measures, and Coinage. The chapters are: 1. The Rise of Humans and Human Technology; 2. The Sources of Energy and Basic Mechanical Devices (subdivisions: A. Sources of Energy, B. Basic Machines, and C. Mechanical Gadgets); 3. Agriculture; 4. Food Processing; 5. Mining and Quarrying; 6. Metallurgy; 7. Construction Engineering; 8. Hydraulic Engineering; 9. Household Industry and Factory Production (subdivisions: A. Metal-Working, B. Wood-Working, C. Textiles and Leather, D. Ceramics and Glass, E. Applied Chemistry, and F. Large-Scale Organized Production); 10. Transportation and Trade (subdivisions: A. Land Transportation, B. Sea Transportation, and C. Standards of Trade); 11. Record-Keeping (A. Time-Keeping and B. Writing and Book Production); 12. Military Technology; and 13. Attitudes towards Labour, Innovation, and Technology.

The discussion of “D. Ceramics and Glass” (pp. 371-380) appears in Chapter 9, commencing with “Ceramic Production” (pp. 371-375) which has seven entries: 9.74: “The Free Turning Potter’s Wheel” (Homer, *Iliad* 18.599-601 and Plutarch, *Morelia* 20:588f); 9.75: “The Perils of Kiln Firing” (Herodotus, *Life of Homer* 32); 9.76: “Poor Instruction by Poor Potters” (Plato, *Republic* 4.421 d-e); 9.77: “Types of Pottery and Centres of Production” (Pliny, *Natural History* 35.159-161, 163); 9.78: “The Prominence of Athens in Ceramic Production” (Athenaeus, *Philosophers at Dinner* 1.28c); 9.78: “Pithoi (Large Jars) Used for Temporary Housing” (Aristophanes, *Knights* 792-793); and 9.80: “A Pottery Workshop in Roman Egypt” (*P. Oxy. [Oxyrhynchus Papyi* 50] 3595). “Glass Production” (pp. 375-380) also has seven entries, with citations from Pliny, Strabo, Josephus, Martial, and Ulpian, among others.

Science in Archaeology and Archaeo-Materials, Arun Kumar Biswas (ed.). New Delhi: D. K. Printworld Pvt. Ltd., 2005, x + 374 pp., figures, tables, plates, list of contributors, index. ISBN: 8124603111, \$90.00 US. Arun Kumar Biswas was educated at the Calcutta University and the Massachusetts Institute of Technology, served as Professor at the Indian Institute of Technology, Kanpur (1963-1995), and the Asiatic Society, Calcutta (1995-date). An authority on applied chemistry, surface chemistry, mineral engineering, archaeo-metallurgy, the history of science, and the Ramakrishna-Vivekananda literature, Professor Biswas continues to nurture concepts of archaeo-material science, futuristic emphasis on the history of civilization, and lastly syncretism of science, spirituality and the Vedantic concept of socialism (samya). His published work comprises about a hundred articles and over a dozen books. This volume,

in which twenty-six authors have collaborated to present fifteen articles, seeks to level a new focus on archaeology and underscore the importance of using scientific knowledge and methods in its pursuit. The book is divided into two distinct parts, "Science in Archaeological Studies" and "Science in Archaeo-material Studies." The first chapter reviews the "two cultures" (science and culture) inherent in archaeology and strongly endorses the scientific aspect. Recent contributions of modern science towards archaeological research are reviewed. Diverse methods such as radiocarbon dating; remote sensing in archaeological surveys aided by micro-electronics; genetic perspectives on the Indian population; analysis of archaeological residues and slag, Indian pottery and archaeo-metals; the use of non-destructive testing methodologies etc., are detailed.

Part I: Science in Archaeological Studies (six chapters): 1. Science in Archaeology; 2. Prehistoric Sequence Datings: A Review; 3. Radiocarbon Dating by Accelerator Mass Spectrometry in Archaeology; 4. Spatio-thematic Information: Role of Remote-Sensing – An Aid to Archaeological Survey; 5. Microelectronics in Archaeological Remote Sensing; and 6. Genetic Perspective of Origin and Evolution of Indian Population. Part II: (nine chapters): 7. Remains, Residues and Slags in Indian Archaeology; 8. Beyond Waves and Shapes: Gaining a Petrographic Perspective; 9. Pottery Technology and Provenance Studies; 10. Metallurgy for Archaeology; 11. Copper and Copper Alloys in Archaeological Perspective; 12. Emission Spectrography as a Scientific Tool; 13. Characterization of Rust on Ancient Indian Iron; 14. Basic Principles and Modern Techniques in the Studies of Archaeo-Materials in Eastern India; and 15. Non-destructive Evaluation for Characterization of Archaeometallurgy Objects. Chapter 8 is a useful summary of petrographic studies, while Chapter 9 is a specific study of ceramic provenience. The book is available from Bagchee.com Pvt. Ltd., 4384/4A Ansari Road, New Delhi 110002, India; Internet site at <http://bagchee.com/index.aspx>.

Geologic Map of North America (compiled by John C. Reed Jr., John O. Wheeler, and Brian E. Tucholke; Washington, DC: Geological Society of America, 2005) took nearly 20 years to create and covers ~15% of Earth's surface. This map differs from previous maps in several important respects: It is the first such map to depict the geology of the seafloor, the first compiled since the general acceptance of plate-tectonic theory, and the first since radiometric dates for plutonic and volcanic rocks became widely available. It also reflects enormous advances in conventional geologic mapping, advances that have led to a significant increase in the complexity of the map. The new map, printed in 11 colors and 700 shades, distinguishes more than 900 rock units, 110 of which are offshore. It depicts more than seven times the number of on-land units as are shown on its immediate predecessor, as well as many more faults and additional features such as volcanoes, calderas, impact structures, small bodies of unusual igneous rocks, and diapirs. The new map shows seven times as many land rock units as the 1965 map, as well as sea mount chains, spreading centers and subduction zones in the oceans. The new *Geologic Map of*

North America is also a "thinking map," a source for new interpretations of the geology of North America, insights into the evolution of the continent, new exploration strategies for the discovery of mineral and energy resources, and the development of better ways to assess and mitigate environmental risks and geologic hazards.

The Table of Contents includes: Introduction; Previous Geologic Maps of North America; Eighteenth and Nineteenth Century Maps; Twentieth Century Maps; Willis Map of 1906; Willis-Stose Map of 1911; Stose Map of 1946; Goddard Map of 1965; The Decade of North American Geology Geologic Map of North America; Philosophy and Design; Contents of the Map; Rock Units; Symbolization; Color Design; Layout of the Explanation; Base Map and Projection; How the Map was Made; Siberia, Alaska, Conterminous United States, Mexico, Central America, Colombia, Venezuela, and the Antilles; Canada, Greenland, Iceland, and Westernmost Ireland; Geology of the Seafloor around North America; Introduction; Nature of Data; Methods; Contributors; Mapped Seafloor Geologic Features; Bathymetry; Submarine Canyons, Sea Valleys, and Mid-Ocean Channels; Outcrop Patterns — Age, Extent, and Composition; Oceanic Crust and Crustal Isochrons; Seamounts; Faults; Hydrothermal Vents and Sulfide Deposits; Seeps; Sediment Drifts and Abyssal-current Erosion; Iron-manganese Deposits; Phosphorite Deposits; Digital Cartography; Data Sources; Digital Database; Uses of the Geologic Map of North America; Future Revisions and Additions; Appendix 1: Review of National Geological Maps of Canada 1865–1996; Acknowledgments; and References Cited. The USGS Product Code is CSM001R. The cost to GSA members is \$125.00, for others it is \$155.00. For additional information and order form, see the GSA Internet site at <http://rock.geosociety.org/bookstore/default.asp?oID=0&catID=2&pID=CSM001R>.

Previous Meetings

The 35th Annual Meeting of the Middle Atlantic Archaeological Conference was held 11-13 March 2005 in Rehoboth Beach, Delaware. Session 3: Ceramics in the Middle Atlantic Region (chaired by Tom Bodor) had six papers: "The Stoneware Kiln of Charles F. Decker in Washington County, Virginia (1869-1873)" by William Hoffman; "Carpetbaggers and Pottery Kilns: A Historical Context for the Frederick Decker Kiln in Abingdon, Virginia" by Tom Bodor and Chris Sperling; "Rockingham Wares from the Coxon Waster Dump in Trenton, New Jersey" by Rebecca White (Hunter Research); "18th Century Kemple Stoneware Pottery in New Jersey" by Brenda Springsted (Richard Grubb and Associates); "Lost Tradition: A Proposal to Rediscover Historic Pottery-Making in Delaware" by Christopher Espenshade (Skelley and Loy); and "A Clean, Well-lighted Place: An Analysis of Ceramic Assemblages of the King's Arms and a Bunch of Grapes Taverns, Hampton, Virginia" by Christopher McDaid (U.S. Army Installation Management Agency). Three other papers on ceramics were presented in other sessions: "Rumney's Tavern Talks: Plates, Pipes, and the Rockman-Rothschild Paradigm" by Mechelle

Kerns-Nocerito (Anne Arundel County's Lost Towns Project); "Clay sources and Variability in Native American Pottery" by Michael Stewart (Temple University); and "A Surface Attrition Study of Low-Fired Ceramic Vessels: Cooking with Hot Rocks" by Joseph Blondino, M. Kaktins, E. Krall, and G. Pevernik (Temple University).

Metalwork in Iraq in Early Islamic Times was the title of an illustrated lecture by James Allan (Keeper of the Department of Eastern Art, Ashmolean Museum, Oxford, England) at the Smithsonian Institution's Freer Gallery, Washington, DC, on 17 March 2005. Professor Allan's talk focused on the use of Sasanian imagery on metalwork and other objects, including ceramics, produced at the court of the Abbasids (750-1258) in Iraq. The interconnections between ceramics and metalwork were emphasized, and examples from the current exhibition "Iraq and China: Ceramics, Trade, and Innovation," were referenced. This exhibition of 20 objects has been extended to 17 July 2005. Professor Allan demonstrated that ceramic copies of metal prototypes were fabricated more commonly than thought previously. Chinese and Abbasid artifacts were linked to a Charlemagne and to a pulpit at Aachen sponsored by Henry II.

The 35th Annual Middle Atlantic Symposium in the History of Art cosponsored by the National Gallery of Art Center for Advanced Study in the Visual Arts and the University of Maryland Department of Art History and Archaeology was held 1-2 April 2005 at the gallery and at the university. Among the 18 invited papers presented was "On the Periphery, at the Center: Athenian Pottery in the Sicilian Heartland" by Justin St. P. Walsh (University of Virginia).

The Second New Jersey Ceramics Symposium co-sponsored by the Potteries of Trenton Society and the New Jersey Historical Society was held on 9 April 2005 at the New Jersey Historical Society in Newark, New Jersey. This is the second year in which the Potteries of Trenton Society (POTS) will team with the New Jersey Historical Society (NJHS) to offer a day-long series of lectures on New Jersey's ceramic industry. "Filling America's Cupboards: New Jersey's Nineteenth-Century Earthenwares" brought together historians, archaeologists and collectors to discuss New Jersey's nineteenth-century earthenware industry and its important role in supplying sturdy table, kitchen, and sanitary wares to America's households. The very successful 2004 symposium was "Early Stoneware in New Jersey and New York: Origins of an American Industry." The 2005 symposium features papers by Richard Hunter on "Country Pottery, City Factory: Industrializing New Jersey Earthenwares"; Emma Lewis speaking on "Fancy Rockingham: A Virtual Tour of the Exhibition at the University of Richmond"; Rebecca White presenting "Rebekah at the Marriott: Identifying Trenton's Rockingham from Archaeological Evidence"; William B. Liebeknecht on "Mayer's Unmarked Majolica: Trenton's Treasures Revealed"; Jane Clancy speaking about "Please Spit in [this] Box: Refinement and other Rockingham-Ware Contributions to American Culture"; and Ellen Denker presented "Jersey City's Ivory White Ware and America's

China Painters." Archaeologist Richard Hunter presented an overview of the earthenware industry in New Jersey, followed by art historian and collector Emma Lewis, who gave a virtual tour of "Fancy Rockingham," an exhibition currently on view at the University of Richmond. Rockingham is the name for kitchen and table crockery with a mottled brown glaze that was popular in America from the 1840s to 1900. Historian Jane Clancy (author of *Rockingham Ware in American Culture 1830-1930*, Hanover, NH: University Press of New England, 2004) will examine the way in which mundane Rockingham wares, such as cuspidors, pitchers, teapots and bowls, expressed cultural identity. Archaeologist Rebecca White discussed the yellow ware industry in Trenton, while archaeologist William Liebeknecht examined Trenton's colorful majolica products, focusing on recent discoveries of the Mayer pottery. Historian Ellen Denker examined the way in which independent china decorators across the country used the cream-colored earthenware blanks produced in Jersey City in the late 1800s. Additional information is available on the Internet at visit www.potteriesoftrentonsociety.org.

Surrey-Hampshire Border Ware: Latest Research, New Discoveries was the subject and title of a seminar sponsored by the London Archaeological Archive and Research Centre and held at Mortimer Wheeler House, London on 22 April 2005. The presentations included: "Introduction to the Surrey-Hampshire Border Ware Industry: The Main Fabrics and Forms, Chronology, Production Centres, Markets, and Significance" (Tony Grey and Jacqui Pearce); "The Farnborough Hill Convent Excavations, 1968-72: The Site, Its Kilns and Dating" (Tony Grey); "Surrey-Hampshire Border Wares in the Museum of London Ceramics and Glass Collection" (viewing and handling session); "Farnborough Hill: Fabric, Form and Function, and Developments in the Late Medieval/Early Modern Transitional Period" (Jacqui Pearce); "Technology: Manufacturing and Firing Faults from the Farnborough Hill Site" (viewing of examples/handling session, Tony Grey); and "Surrey-Hampshire Border Wares from London: An Overview and Directions for Future Research" (Jacqui Pearce). The Surrey County Council website provides additional information: <http://www.surreycc.gov.uk>.

Forthcoming Meetings

The 35th International Symposium on Archaeometry (35th ISA) is scheduled to be held from 10-15 May 2005 in Beijing, PRC and is sponsored by the University of Science & Technology of China, PRC. The Symposium will be held in the Center for International Conference, a 4-star hotel in the southern part of Beijing. The President of the Standing Committee is M. S. Tite (Oxford), with Y. Maniatis (Athens) as Chairman. The Committee members are: L. Barba (Mexico City), K. T. Biro (Budapest), R. M. Farquhar (Toronto), H. Kars (Amsterdam), P. Meyers (Los Angeles), J. -F. Moreau (Quebec), J. Pérez-Arantegui (Zaragoza), G. A. Wagner (Heidelberg), Ch. Wang (Hefei), and S. U. Wissemann (Urbana). The Local Organizing Committee is chaired by Changsui Wang (Hefei) with Yueping Nie (Beijing) as Vice Chairman. There

will be seven sessions (with no parallel sessions); six of are “regular,” while the seventh is selected by the local organizing committee focusing mainly on Chinese archaeometry. These sessions are: 1. Field archaeology (remote sensing, prospecting) and environmental archaeology; 2. Dating (organic and inorganic materials); 3. Biomaterials (DNA, dietary, organic residues analysis and agricultural archaeology); 4. Technology and provenance (stone, plaster and pigments); 5. Technology and provenance (ceramics and glass); 6. Technology and provenance (metals); and 7. Special reports (achievements and perspectives on Chinese archaeometry). For additional information, visit the Internet site at <http://www.archaeometry.ustc.edu.cn/text/2nd%20circular.doc> For further information, contact Dr. Yaowu Hu, Department of Scientific History & Archaeometry, University of Science and Technology of China, No. 96 Jinzhai Rd., Hefei, Anhui, P.R. China, 230026; telephone +86-551-3603914, fax: +86-551-3603576, e-mail: ywhu@ustc.edu.cn, Website: www.archaeometry.ustc.edu.cn.

The First Argentinean Archaeometry Congress: Scientific Methods Applied to the Study of Cultural Materials/Primer Congreso Argentino de Arqueometria: Metodológicas Científicas Aplicadas al Estudio de los Bienes Culturales – Datación, Caracterización, Prospección, Conservación. The congress will be held in Rosario, Argentina, 20-21 October 2005 and is organized by the Facultad de Humanidades y Artes and Facultad de Ingeniería, Ciencias Exactas y Agrimensura at Universidad Nacional de Rosario. Additional information on registration is available on the Internet at congreso.arqueometria@gmail.com. There is a planned session on materials characterisation that would include ceramics. Comité Científico: Alberto Rex González, Dora Krasnopolsky de Grinberg, Víctor A. Núñez Regueiro, Aníbal J. Figini, Noemí E. Walsøe de Reca, Daniel Schavelzon, Myriam N. Tarragó, Antonio Introcaso, Antonio G. Austral, Roberto Bárcena, and Humberto Lagiglia, Edgardo Garbulsky, María Carlota Sempé, and Ruth A. Poujade. El Congreso Argentino de Arqueometría tendrá las siguientes actividades: 1. Sesiones Plenarias de Apertura y Clausura; 2. Conferencias Magistrales; 3. Mesas de Comunicaciones; and 4. Reuniones sociales, programa cultural y turismo. Las Mesas de Comunicaciones serán: Arqueometría de la datación; Prospección y otras aplicaciones en trabajos de campo; Caracterización de Materiales (biológicos, metálicos, cerámicos, pétreos, pigmentos, vidrios, etc.); Preservación y Conservación; and Estadística e Informática aplicadas a la Arqueología. Los interesados en presentar trabajos deberán remitir antes del 30 de abril de 2005 un resumen de una página como máximo en Word 6.0 o superior, formato A4, letra Times New Roman 12, interlineado 1,5 que incluya además los siguientes datos: Título (Mayúsculas y Negrita); Mesa de Comunicaciones en que desea presentarlo; Apellido/s y Nombre/s de Autor/a (es/as); Institución a la que pertenece/n; and e-mail. Los mismos deberán enviarse del siguiente modo (impreso (2 copias) por correo postal a: Comisión Organizadora, Primer Congreso Argentino de Arqueometría, Laboratorio de Materiales y Tecnologías, Escuela de Antropología, Facultad de Humanidades y Artes, Universidad

Nacional de Rosario, Entre Ríos 758. CP 2000. Rosario (Santa Fe) – Argentina.

The 2005 Australasian Archaeometry Conference has scheduled its meeting at the Australian National University, Canberra, Australia for 12-15 December 2005. The meeting will be hosted by the Department of Archaeology and Natural History, Research School of Pacific and Asian Studies (RSPAS), and the Centre for Archaeological Research. The organizing committee invited sessions covering all aspects of scientific applications (biological, physical and chemical sciences) in archaeology. Session proposals (title and max. 200-word abstract) were due by 11 February 2005 and are under review. The organizing committee is considering theoretical and interpretative sessions as well as those involving archaeometrical techniques. Sessions and papers usually focus on Australasia and the broader Asia-Pacific region, but sessions/papers by researchers working in other geographical areas are also under consideration, especially if they have relevance to work within the region (e.g. help to build up technical competency etc.). Details will be regularly posted on the conference website: http://car.anu.edu.au/Archaeometry/archaeometry_conference.html. For further details and to submit session/workshop proposals contact: Andrew Fairbairn (andrew.fairbairn@anu.edu.au) or Sue O’Connor (sue.oconnor@anu.edu.au) at the Department of Archaeology and Natural History, RSPAS, Coombs Building, Australian National University, ACT 0200, Australia.

Call for Papers

The American Schools of Oriental Research (ASOR), located at Boston University (656 Beacon St., 5th floor, Boston, MA 02215) is planning a session, “Artifacts: The Inside Story,” for inclusion at the annual meeting to be held 16-19 November 2005 in Philadelphia, PA (Hyatt Hotel at Penn’s Landing). The session welcomes submissions in which the analysis of Near Eastern artifacts by means of physical or chemical techniques has led to a new or re-interpretation of the archaeological record. This year’s theme, “From Processing to Provenience”, includes such topics as raw material acquisition, manufacturing techniques, and product distribution. The session is planned for 4-5 speakers and papers will be limited to 20-25 minutes. Abstracts (with a deadline of 1 April 2005) are limited to 250 words and should be e-mailed to the Section Chair: Elizabeth Friedman; Department of Biological, Chemical, and Physical Sciences; Illinois Institute of Technology, 3101 S. Dearborn, Chicago, IL 60616 (telephone: 312/567-7973; fax: 312/567-3494; e-mail: friedman@iit.edu). Another ACOR session, “Art and Artifacts of the Ancient Near East,” welcomes submissions that present innovative analyses of any facet of Near Eastern artistic production or visual culture. Submissions should be directed to the Section Chair: Marian Feldman, Department of Near Eastern Studies, University of California-Berkeley, 250 Barrows Hall #1940, Berkeley, CA 94720, USA (telephone: 510/642-7793, e-mail: feldman@calmail.berkeley.edu). Please check the ASOR website: <http://www.asor.org/> for more details on this conference.

Maria Masucci (Associate Professor and Director of the Archaeology Program, Department of Anthropology, Drew University, Madison, NJ 07940 USA) is planning to propose a session for the 2006 *Society for American Archaeology* annual meeting (scheduled for 26-30 April 2006 in San Juan, Puerto Rico) on the current state (successes, problems, future prospects, etc.) of the petrographic analysis of ceramics. Anyone interested in preparing a paper for this session should contact Maria at MMASUCCI@drew.edu. Please check the SAA website for membership and participation requirements.

Field Opportunity

Ethnoarchaeological Research: Inka Technology (Huanuco, Peru): Ceramics are included. This volunteer program located in Huanuco/La Union, Perú, has three two-week sessions: Session I: June 20 to July 3; Session II: July 4-17; Session III: July 18-31. The application deadline is May 20, 2005. Further information is available on the Internet at <http://www.andescience.org/>. The program is directed by Jose Luis Pino and Giancarlo Ubillus and is designed to "rescue the traditional knowledge using ethnoarchaeological studies at the province of La Union State of Huanuco in central highlands of Peru." In this region, ancient techniques of storage, pottery, weaving, etc. are still practiced. This will allow a comparative and interdisciplinary study to understand the "basic" technology used in Inka's period at "Huanuco Pampa" area. The fieldwork will consist of work with indigenous communities recording information by taking fieldnotes, pictures, drawings, and measures of traditional technologies and the process of production to compare with the archaeological record. We will also use experimental methods in copying Inka buildings to obtain information about storage systems and household technologies. The area of ethnoarchaeological study will be the communities around Huanuco Pampa and Sillapata. The archaeoastronomical study will take place in the archaeological buildings associated with the Inka site. The project will provide training in procedures of recording ethnoarchaeological, ethnobotanical, and archaeoastronomical information that will be directed by archeologists and biologists with experience in these kinds of studies. Contact information: Cesar Guerra, Department of Physics - PUCP, Avenida Universitaria Cuadra 18 s/n, San Miguel, Lima, Lima 32, Peru; e-mail cguerra@fisica.pucp.edu.pe.

Statuses of Four Ceramic Newsletters

ACRO Update: Asian Ceramics Research Organization is edited by Chuimei Ho and Bennet Bronson, both at the Field Museum of Natural History, Chicago, Illinois, USA. Subscriptions to this quarterly newsletter are \$25.00/\$42.00/\$95.00 for periods of one, two, or five years (plus \$3.00 for overseas subscriptions). The ACRO mailing address is P. O. Box 14419, Chicago, IL 60614-0419, USA; e-mail acrochicago@earthlink.net. There is no Internet site.

La Tinaja: A Newsletter of Archaeological Ceramics is co-edited by George Bey III and Michael Galat (Department of

Sociology and Anthropology, Millsaps College, 1710 N. State Street, Jackson, Mississippi 39210, USA). Subscriptions to this newsletter (two or three issues per annum) are currently \$10.00 per year. There is no Internet site, but the editors may be contacted via e-mail: beygj@millsaps.edu or galatml@millsaps.edu. The last issue published was 15(2), Spring-Summer 2004.

Old Potter's Almanack, the Joint Newsletter of the Prehistoric Ceramics Research Group and The Ceramic Petrology Group (British Museum, London), is published three times per year and has an annual subscription of £7.50 (about \$14.00 US cy). The current editors are: Louise Joyner for CPG (School of History and Archaeology, Cardiff University, P. O. Box 909, Cardiff CF10 3XU; e-mail joynerl@cardiff.ac.uk) and Alex Gibson for PCRG (Department of Archaeological sciences, University of Bradford, Bradford BD7 10P; e-mail a.m.gibson1@bradford.ac.uk). Each group has an active Internet site: <http://www.ceramicpetrology.uklinux.net> and <http://www.prehistoric-ceramics.org.uk>. Subscriptions, payable by cheques in Pounds Sterling or US cash, are received by The Hon. Treasurer, Department of Conservation, Documentation and science; British Museum, Great Russell Street, London WC1B 3DG. The last issue published was 12(2), 2004 with 12(3) in press.

Southeast Asian Ceramics Museum Newsletter a new "monthly" publication began this autumn; issue 1(3), November-December 2004, has just been distributed. Roxanna M. Brown and Partwat Thammaphrethakorn are the editors of this new and completely electronic newsletter which features splendid color illustrations, reports on exhibitions and workshops, and book reviews. For a gratis subscription, send a message to museumnewsletter@bu.ac.th.

Exhibitions

Iraq and China: Ceramics, Trade, and Innovation [Macromedia Flash Reader 6 is required] <http://www.asia.si.edu/exhibitions/online/iraqChina/defaultIC.htm>. The Smithsonian Institution's Freer and Sackler Galleries have devised an online exhibition, tracing the changes in the character of Iraqi ceramics during the 9th century, caused at least in part by the influence of imported luxury Chinese goods, carried by Arab and Persian merchants over an ocean route from the Persian Gulf to the South China Sea. The luminous white and blue glazes of imported Chinese porcelain were much admired in Iraq. Although Iraqi ceramic artists did not have equal raw materials or firing technology to their Chinese counterparts, they cleverly created their own versions using yellow clay, and glazes that turned opaque after firing, creating ceramics that were described as "pearl cups like the moon." The online exhibition is small, showcasing a dozen examples of Iraqi blue and white and luster pottery from the period, along with several Chinese pieces for comparison. There is also a link to the Black and White exhibit.

Faïences de l'Antiquité Égypte, Proche-Orient, Grèce/ The Earthenware of Antiquity: Egypt, the Near East, Greece at the Musée du Louvre, Paris, will run from 1 July through 26

September 2005. The exhibition emphasizes the arts of fired earthenware and utilizes objects from the museum's own collections to illustrate different techniques of fabrication and use. Commissaires de l'exposition: Annie Caubet, conservateur général, chargé du département des Antiquités orientales; and Geneviève Pierrat, conservateur en chef au département des Antiquités égyptiennes.

News

Olmec Ceramics: Jeffrey P. Bloomster, Hector Neff, and Michael D. Glascock authored "Olmec Pottery Production and Export in Ancient Mesoamerica Determined Through Elemental Analysis" *Science* 307(5712):1068-1072, 18 February 2005. Bloomster is at George Washington University, Neff at California State University at Long Beach, and Glascock at the University of Missouri. The authors report the results of instrumental neutron activation analysis (INAA) of 725 archaeological ceramic samples from seven clusters of sites (Basin of Mexico, Valley of Oaxaca, Pacific Coast Isthmus of Tehuantepec, the Soconusco region of the Pacific Coast of Chiapas, and the Chiapas Central Depression). The results of the analysis of the 725 specimens were compared with clays from the seven regions, and demonstrate that exported Olmec-style ceramics originated from the San Lorenzo region of the Gulf Coast and are related to the spread of a unified style and iconographic system in Mesoamérica from 1500 to 1900 BCE. A popular newspaper article resulted from this report and a press conference, "Pottery Presented as Evidence of Olmec Culture's Influence" by Guy Gugliotta, *Washington Post*, Friday, February 18, 2005; URL <http://www.washingtonpost.com/wp-dyn/articles/A32926-2005Feb17.html?sub=AR>. The article states, in part, that while other ancient settlements made pottery with symbols and designs in the "Olmec style," only the early Olmec themselves — at San Lorenzo near Mexico's Gulf Coast — exported their pottery. Blomster's research team "has demonstrated that pots were traded," said archaeologist David C. Grove, a professor emeritus at the University of Illinois at Urbana-Champaign. "They did not demonstrate that trade sent Olmec religious and political ideas" around the region as well. The analysis showed that all seven sites had Olmec-style pottery made from local clays, and all seven also had pottery made at San Lorenzo. But San Lorenzo had nothing from any of the other sites, and the other sites had nothing from one another — only from themselves and San Lorenzo. Richard A. Diehl at the University of Alabama, Tuscaloosa, in a separate article in *Science*, "Patterns of Cultural Primacy" *Science* 307(5712):1055-1056 (18 February 2005) applauded the results and stated that the research resolves some issues in the mother culture-sister culture debate. Gugliotta's article also reports that the University of Michigan's Kent V. Flannery, a leading sister-culture proponent, suggested that the Blomster team had sampled only pottery that looked as if it might have come from San Lorenzo. "It is simply not true that nobody else's ceramics show up in San Lorenzo."

World's Oldest Perfumery: "Archaeological dig sniffs out world's oldest perfumery" by Michael Theodoulou (*The*

Scotsman, Friday, February 25, 2005), <http://news.scotsman.com/international.cfm?id=212432005> Musky, with a woody tone and spicy hints of cinnamon - the perfect fragrance for a Bronze Age date. Italian archaeologists have discovered the world's oldest perfumery and have identified the smells popular with the people of the time. The perfumery was found at a sprawling archaeological site on a hillside overlooking the Mediterranean at Pyrgos-Mavroraki, 55 miles south-west of Nicosia. "This is 4,000 years old. Without a doubt, it is the oldest production site for perfume in the world," said Maria Rosario Belgiorno, the excavation team leader. The site was destroyed by an earthquake in antiquity but the calamity helped preserve the finds and it is now expected to unlock ancient secrets about the surprisingly advanced production methods. "It is possible to reconstruct the technology of the site," Ms Belgiorno said. "It was very sophisticated for the time." The find could explain two names which appear in an industry-standard list of ten fragrance families. Only two refer to geographic regions and both pertain to Chypre, French for Cyprus. Fourteen different perfumes from ten essences were found at the Cyprus site. About a dozen have so far been reconstituted from the fragments of perfume bottles by Italian scientists. Among the aromas found were those of cinnamon, laurel, myrtle, anise and citrus bergamot. Such ingredients are among those detailed by the Roman writer Pliny (AD 23-79), who described the composition of various fragrances in his encyclopaedic *Historia Naturalis*. The ancients required perfumes for more than smelling attractive. Aromatic resins were used in religious ceremonies and funeral rites, as well as for their medical properties. The ancient Egyptians were keen on aromatherapy. "The Cypriots probably learned from the Egyptians. We know there were very strong links between the two," Ms Belgiorno said. Perfumes have even been found in Egyptian predynastic graves. A royal tomb at Abydos dating back to about 3000 BC contained jars with coniferous resin mixed with plant oil and animal fats. Even workmen were said to have received regular supplies of ointment and the first recorded strike in history occurred during the reign of Ramses III (1165 BC), when supplies were interrupted to the tomb builders in the Valley of the Kings. So valued were perfumes that the Pharaohs had "very strong control" of its production, said Ms Belgiorno. The perfumery in Cyprus formed part of a site dating from 2000 BC which included a copper smelting works, a winery and an olive press that provided the base ingredient for the fragrances. Fragments of enormous storage jars capable of holding 500 litres of olive oil were found. The scale of the works suggests perfume played an important role in the island's trade at the time."

Posted to AegeaNet@KU.EDU 2 March 2005: "Italian archeologists have found an 'industrial' olive oil factory in Cyprus dating to 1900 BC, that they think is the oldest ever found. The excavations at Pyrgos, Cyprus have uncovered the remains of a Bronze Age olive press complete with millstones, mortars to crush the olives, and a large limestone slab. "It is the oldest industrial production place discovered so far for working olives and making up perfumes," said Maria Rosaria Belgiorno, a researcher and head of the excavators from the Applied

Technology team (ITABC) from Italy's National Research Council (CNR). The archeologists think olive oil was stored in huge olive jars that could hold up to 500 litres each, and shipped around the Mediterranean for sale. They think that oil was made in the same way as it was in Italy up to about 50 years ago. Part of the oil production seems to have been set aside to make perfumes in an adjacent factory, explained Belgiorno. 'There are five millstones and basins of various sizes to crush the essences, and 14 pits lined with plaster and filled with cinders and charcoal, where small containers for unguents would have been heated.' She said that there may also have been a shop on the site. 'We found tens of vases, basins, cups and perfume carriers under a portico, which makes us think that there was a perfumery here.'" For additional information, contact Maria Rosaria Belgiorno at mariarosaria.belgiorno@itabc.cnr.it

Book Reviews

Stacey N. Lengyel, Associate Editor

Early Earthquakes of the Americas. Robert L. Kovach, Cambridge University Press: New York, 2004. xi + 268 pp., 134 figures, 14 tables, three appendices, glossary, bibliographic summaries, index. Price \$90.00 (cloth). ISBN: 0-521-82489-3.

Reviewed by Payson Sheets, Department of Anthropology, University of Colorado, Boulder, CO 80309-0233.

This book summarizes geological and archaeological knowledge of earthquakes in the New World during the past two millennia, and includes many that occurred in the past couple centuries. The cover photo starts the book off appropriately with a spectacular shot of the cathedral in Arequipa, Peru, being struck by a magnitude 8.4 earthquake. That occurred in June of 2001, and the middle of the tower is disintegrating before our eyes.

The book begins with an introduction to earthquake causes and regional variations, followed by a short consideration of indigenous mythology, and then looks in detail at the effects of earthquakes on architecture and monuments. The book then turns to regional syntheses of earthquakes and their effects in the Maya area, lower Central America, the Andes, California, and North America. The direct historical approach is informally employed in describing historically documented earthquakes and their aftermath as analogs for Pre-Columbian earthquakes. The natural science aspects of the book are its strength, and archaeologists can learn much from the presentation of the surface waves and how they differentially affect buildings. Building construction materials and styles dramatically affect seismic resistance. And occasionally he presents a dramatic example of how earthquakes affect the natural environment. For instance, the surprise experienced by two hunters driving a back road in Idaho when the big 1983 earthquake struck is

almost palpable when they saw a fault scarp rise up almost 2 meters right in front of them in one second, and extend as far as their eyes could see.

Kovach believes archaeologists have underestimated the stresses that earthquakes have placed on Pre-Columbian societies, and he works hard to provide examples to stimulate archaeologists to understand seismic stresses and what to look for at sites. The culture area that he develops his argument most fully is the Maya. Here he provides some original insights that should challenge Mayanists. When Mayanists are asked why stelae (tall upright sculptures) fell after sites were abandoned, most answer that tree fall knocked them down. Stelae falling by being struck by trees would not have a patterned orientation. But Kovach notes that 83% of the stelae at Seibal fell in an east-west direction, and that is the direction he would predict given the proximity and orientation of the closest fault plane. This certainly looks seismic to me. He makes an almost equally compelling argument for orderly stela fall at Pusilha having been seismically-forced. And his description of the directionality of tombstone collapse during the 1925 earthquake in Quebec lends credence to his argument. Unfortunately, a close examination of his data on stelae at Altar de Sacrificios refutes his claim of a seismic cause. He makes the intriguing suggestion that people living at sites close to the active Motagua fault deliberately avoided building roof combs because of seismic risk. Archaeologists are most successful in describing *what* people did, and are sometimes successful in explaining *why* they did it. Explaining why people *did not* do something in antiquity is exceptionally difficult.

The Motagua fault in southeastern Guatemala ruptured in 1976 with a $M = 7.5$ earthquake that occurred at 3:02 am on 4 February. He documents the effects on modern construction as well as the ancient construction at the Maya site of Quirigua. His documentation is remarkably complete, and one can readily understand why buildings and monuments fail under these stresses. Robert Sharer, one of his main sources of information, had the frightening experience of riding the earthquake on his metal frame bed and trying to avoid hitting his head on the wall. The ground motion was so strong he was propelled into the walls of his bedroom a few times, and he finally emerged a bit the worse for wear, but gratefully alive and able to walk.

Archaeologists may find evidence of earthquakes more often than Kovach thinks. For instance, we recently found evidence of a mild earthquake, about magnitude 4, at the Ceren site, El Salvador, dating to the early 600s. It caused some ground cracking and slight structure damage but did not knock round-bottomed pots off of wall tops. We found evidence of much more powerful earthquakes in ancient Costa Rica, near Arenal volcano, as the volcanic vents opened and explosive eruptions ensued. Because the eruptions are well dated, so are the earthquake cracks and the particular tephra that filled in the open crack.

The book documents by ample text and abundant illustration a large number of historic and recent earthquakes. Consistently,

societies suffered in the short range, but recovered within a few years. Why Kovach assumes that similar earthquakes would have caused much greater devastation for Pre-Columbian societies, and in many cases contributing to their collapses, is unclear. Does he assume ancient native people were less perceptive of risk, or less innovative in coping behavior? Other scholars have documented natural disasters among ancient societies, and societal resilience is more common than collapse. Societies, whether ancient or modern, learn from disasters, and we can see in seismically active areas where people developed highly resistant domestic architecture. One of the important research directions among social scientists in recent decades is that natural disasters have creative effects on societies, as they learn from the past to cope with the present and future. Wattle and daub vernacular architecture was developed in earthquake country throughout Mesoamerica, and it even today withstands large earthquakes better than modern architecture. And when it does fail in a really great earthquake, the daub fragments are rarely larger than a grapefruit, resulting in cuts and bruises. The roof beams tied tightly to the wall post supports move with the seismic waves, and the thatch roof is light. Contrast that to unreinforced adobe brick walls and heavy fired tile roofs that, when they collapse, are the main cause of deaths in non-indigenous communities in Latin America today. Kovach could have made good cases by describing the seismic resistance of Inca architecture, with its trapezoidal doorways and windows, and their interlocking masonry. I think it is also important to explore when societies accept increased risk in their buildings. In Mesoamerica when rulers built monumental buildings they often sacrificed seismic resistance, as did emperors in China. Religious buildings in Mesoamerica sometimes were more fragile than domestic buildings, for reasons that are unclear.

Some minor mistakes occurred, perhaps because some outmoded archaeological sources were used. For instance, the "Maya Empire" is referred to often. But there never was such an empire. The Maya highly valued political independence of individual city states, much like the ancient Greeks, and they successfully avoided the appearance of a single capitol that dominated the entire Maya area at any time during the centuries of their existence.

The successes and the innovative suggestions of the book far outweigh any shortcomings. The book is intellectually challenging, didactic, and richly illustrated. Even the cursory reader will question their "terra firma" assumptions. The glossary is very useful to those with lean knowledge of geophysics, making the book accessible to a wide range of readers. Kovach is to be credited for courageously forging beyond the boundary of his discipline, and I encourage archaeologists to broaden their thinking and test some of his suggestions and hypotheses.

Rose Kerr and Nigel Wood, with contributions by Ts'ai Meifen and Zhang Fukang, Cambridge University Press: New York, 2004. xlix + 918 pp., illustrations, tables, charts, bibliographies, index. Price \$195.00 (cloth). ISBN: 0-521-83833-9.

Reviewed by Charles C. Kolb, Division of Preservation and Access, National Endowment for the Humanities, Washington, DC 20506.

The *Science and Civilisation in China* series, planned as a history of science, technology and medicine in China, was conceived by the late Joseph Needham (1900-1995), who directly supervised the publication of seventeen books in the series, from the incipient volume published in 1954, through volume VI.3, which was in press at the time of his death in March 1995. The background and conceptualization of the compendium is available on the Internet at <http://www.nri.org.uk/joseph.html> Page ii of the current volume incorrectly lists Joseph Needham's birth date as 1990 instead of 1900. The original proposal expanded from seven volumes, with the fourth onwards split into multiple parts so that 23 parts have been published and five other are in various stages of composition. The majority of the early volumes were written by Needham himself, the last ones being VI.6, *Biology and Biological Technology: Medicine*, with Lu Gwei-djen, and edited by Nathan Silvin (2000); and VII.2, *The Social Background: General Conclusions and Reflections*, edited by Kenneth Girdwood Robinson (2004). The Needham Research Institute in Cambridge, under the chairmanship of Christopher Cullen, who is also the general editor of the series, has undertaken the completion of this weighty (6.2 pounds) monumental and comprehensive tome on the history of Chinese ceramic technology. The first formal public appearance of this volume took place at the Asia Society in New York on October 7, 2004, with a lecture by Rose Kerr, and later that month a copy was presented to the mayor of the porcelain production city of Jingdezhen as part of a millennial celebration.

The senior author is well-known as a scholar of Chinese ceramics and has written numerous books and articles, among the former are *Blanc de Chine: Porcelain from Dehua* by Rose Kerr and John Ayers, with contributions from Chuime Ho et al. (Singapore: Asian Civilisations Museum, Landmark Books, 2002); *Ceramic Evolution in the Middle Ming Period: Hongzhi to Wanli (1488-1620)* [*Ji gu qing hui Ming dai ci: Hongzhi zhi Wanli/Su Meigui, Ke Meigui*] by Rosemary Scott and Rose Kerr (Singapore: Sun Tree Publications, 1994); *Chinese Art and Design: Art Objects in Ritual and Daily Life* edited by Rose Kerr, text by Rose Kerr, Verity Wilson, and Craig Clunas (Woodstock, NY: Overlook Press, 1991); *Chinese Ceramics: Porcelain of the Qing Dynasty, 1644-1911* by Rose Kerr (London: Victoria and Albert Museum, 1986); *Kiln Sites of Ancient China: An Exhibition Lent by the People's Republic of China*, compiled by Penelope Hughes Stanton and Rose Kerr (London: Oriental Ceramic Society, 1981); and *Later Chinese Bronzes* by Rose Kerr (London: Bamboo Publications in association with the Victoria and Albert Museum, 1990). Nigel Wood is the author of *Chinese Glazes:*

Their Origins, Chemistry, and Recreation (London: A. & C. Black; Philadelphia: University of Pennsylvania Press, 1999); and *Oriental Glazes: Their Chemistry, Origins, and Recreation* (London: Pitman; New York: Watson Guptill, 1978).

This volume on Chinese ceramic technology, which commences with a preface by the series editor, Christopher Cullen, and another co-authored by Kerr and Wood, is divided into seven parts with 798 pages of text. The narrative is supplemented by 172 illustrations (85 in color), 147 tables, 11 charts, a list of 156 abbreviations (Western journals, $n = 78$; Chinese journals $n = 29$; Chinese and Japanese book collections and series, $n = 49$). There are three separate bibliographies with a total of 1,602 entries: "Chinese and Japanese books and articles before +1912" ($n = 207$); Chinese, Korean and Japanese books and journal articles since +1912" ($n = 329$); and "Bibliography" ($n = 1,066$). The content of the 37-page double-column index emphasizes proper nouns rather than topics and contains approximately 3,900 entries. These span A to Z and include Dean Arnold's (1985) "classic," as well as important works by Roxanna Brown, Louise Cort, Ian Freestone, Chuimei Ho, David Kingery, Chris Pool, Owen Rye, Ed Sayre, Bill Sillar, Carla Sinopoli, Mike Tite, Ann Underhill, Pam Vandiver, and Nigel Wood.

This long awaited fifth volume of Joseph Needham's immense undertaking was published in November 2004 and covers the subjects of chemistry and chemical technology. The twelfth part of the volume explores a range of questions concerning Chinese ceramic technology, including how Chinese ceramic vessels were made, glazed and fired. Among other subjects reported are why and how China discovered porcelain more than one thousand years before the West, and the effects of China's influence on world ceramics. These issues (and many more) are answered in this well-illustrated history of Chinese ceramic technology. The authors employ historical texts, archaeological excavation reports, and the principles of ceramic science in this massive treatise. Other chapters consider the formation of clays and their relation to the underlying geologies of China, and document firing, manufacturing methods and sequences, glazes, pigments and gilding, and the impact of Chinese ceramic technology around the world, from the 7th through the 21st centuries. The volume is unique in its coverage, which brings together for the first time research materials in multiple languages. I shall describe the contents of each of the book's seven parts. Each of these has a brief summary of the contents of that part.

"Part 1: Setting the Scene" (pp. 1-86) provides essential historical background and a very basic review of ceramic manufacture. Initially, these essays (pp. 1-40) cover the status of ceramics in early China from the Paleolithic and Neolithic periods, and the Bronze Age. Chinese ceramic types and terms are defined and an early historiography of Chinese ceramics is delineated, particularly related to the Chin and Han periods. Later texts on Chinese ceramics and treatises on agriculture and crafts are documented, as are important Chinese gazetteers. There are separate sections concerning the literature related

to the world famous Ching-te-chen production center, connoisseurship, official historiographies (standard histories, records and collected statutes), literature in Western languages, and the archaeological literature of the 20th and 21st centuries. A subsequent set of essays (pp. 40-86) provides an introduction to raw materials, firing, forming and glazing. These commence with the nature and origin of clay, weathering (mechanical, chemical, and tropical), hydrothermal and volcanic alteration, the major clay types in China, the Nan-shan Chhin-ling geological "divide," kilns and firing (processes and stages), firing in north versus south China, fuels, sources of fuels in firing historical ceramics, stages in "burning," working with plastic clays, throwing pots, removing vessels from the wheel, and turning and molding. Other salient topics include the nature of glass and glazes, fluxes, eutectic mixtures ($\text{SiO}_2\text{-Na}_2\text{O-CaO}$), silica-sodium oxide system, the use of calcia as a stabilizer, and an exposition on early Chinese glazes. Table 2 provides a useful analysis of the genesis of clays from granite.

"Part 2: Clays" (pp. 87-281) has seven subsections. The initial section, "Earthenwares and stonewares to the Han dynasty" (pp. 31-142), provides 31 essays on a variety of topics that commence with the influence of the north-south divide on Chinese ceramics, documents loess and paleosols, the use of loess in Neolithic period ceramics, changes from oxidation to reduction firing of loess ceramics, properties of loess pottery, the use of loess in Shang dynasty ceramics and bronze-casting, "refactoriness," and loess as a building material. Various ceramic forms (pipes, well casings, hollow bricks, strip brick and tiles) and Chhin dynasty architectural ceramics are reviewed. In addition, there are reports on loess in Bronze Age ceramic vessels, and in Han dynasty ceramics, architectural elements, as well as the terracotta warriors, and glazed ceramics (including high-fired glazes and pyrometric cones). Northern whitewares, an oxide analysis of clays and glazes (pp. 121-122), kaolinitic clays of north China, Shang dynasty whitewares, Any-yang glazed stonewares, compositional distinctions between northern and southern stoneware clays (pp. 129-132), and several essays on southern glazes stonewares. There is also a section devoted to porcelain developments in northern China (pp. 143-164) that relates possible contributing factors to the success of southern glazed stoneware, and essays on Chinese porcelains, slips, Kung-hsein and Hsing wares, Hsing raw materials, feldspathic Hsing ceramics, Ting ware and its composition, and a report on other northern Chinese porcelain manufacturing sites. A third section, "Stoneware in north China in the post +10th century" (pp. 164-180) focuses on Yau-chou and other historic stonewares, historical monuments that document stoneware manufacture, various wares (Ju, Chün, and Tzhu-chou), and clay compositions (pp. 175-180). Section four, "Development and growth of southern porcelain" (pp. 181-184), focuses on the development of whitewares. "Chinese porcelain and the city of Ching-te-chen" (pp. 184-239) documents the porcelain industry in that region, considers official control of the pottery industry and the imperial kilns, the imperial factory, production quotas, porcelain decorations and sumptuary regulations, labor relations, technological developments in the development of Ching-te-

chen porcelain, Ching-te-chen Five Dynasties whiteware, and the geology of porcelain stone. The mining, preparation, and refining of the stone, the introduction of kaolin at Ching-te-chen, and the nature and preparation of kaolin are also reported. Another section, "Other notable southern wares" (pp. 240-266), summarizes information on Te-hua ware (clays, production, glazes, oxidation, and translucent properties), Lung-chhüan celadon wares (technical development, physical properties, red clays, and porcellaneous materials), Southern Sung dynasty Kuan ware, the Kuan kilns at Hang-chou (Hsui-wei Hsu and Chaio-than Hsia), Lao-hu-tung sherds, Hang-chou and Lung-chhüan Kuan wares, and the "mystery" of Ko ware. A final section, "Stonewares and teawares in south China," provides information about dark-bodied stonewares, Chien ware, various teawares (notably Hsing, Yüeh, Sung- dynasty, and I-hsing), and Chi-chou clays and products.

"Part 3: Kilns" (pp. 283-377), begins with a consideration of Neolithic bonfire kilns, up-draught kilns and reduction-firing. Among the topics detailed (pp. 283-301) are early Chinese bonfire wares, the development of "true" ceramic kilns, the earliest Neolithic ceramics, and early northern up-draught kilns, data on fireboxes and superstructures, and firing (oxidation, reduction, and carbonization). Grey-brick production, water-gas reduction in brick kilns, air-starved fuel reduction and carbonizing, and Liang-chu culture blackwares from south China are also documented. A brief section is devoted to cross-draught kilns which emphasize Bronze Age structures, northern ceramics and iron casting, and northern brick kilns (pp. 302-313). *Man-thou* kilns are treated thoroughly (pp. 314-346). This section contains a review of high-temperature kilns and essays on the advantages of coal as a fuel, the burning of wood and coal in high-temperature kilns, firing stages, a comparison of cross-draught and down-draught kilns, cooling, and soaking. A useful discussion of the distribution of these kilns is accompanied by essays on the setting techniques, kiln furniture, Shang dynasty setting practices, a review of Han dynasty glazed wares, Thang dynasty *san-tshai* wares, high temperature kiln setting methods and the use of saggars, and setters. In a subsequent discussion on dragon or *lung* kilns (pp. 347-364), the authors assess what is known of the origin of dragon kilns, the side-stoking procedure, evenness of firing, construction features, the Lung-chhüan kilns, improvements in kiln design, comparisons of northern and southern variants, and step kilns. A final set of essays (pp. 365-377) concern the kilns at Ching-te-chen, focusing on their development and the evolution of the "egg-shaped" kiln and includes historical data on setting and firing. Other topics include dragon cistern kilns, green kilns, enamel kilns, and saggars kilns.

In "Part 4: Manufacturing Methods and Sequences" (pp. 379-453), the authors take a chronological approach. The section on "Neolithic techniques" (pp. 379-395) commences with a discussion of modeling clay during the Paleolithic period and "Stone Age" styles of pottery production in present-day Yunnan. The use of xeroradiography (pp. 382-385) is reviewed (accompanied by splendid color images) and the authors document hand-building methods, the use of the slow wheel,

Neolithic potter's wheels, decoration, the transition from slow to fast wheels, origins of throwing, the throwing and turning of Lung-shan wares, the adoption of handles, and south Chinese Lian-chu culture blackwares. In "Bronze Age techniques" (pp. 396-427) the authors review clay-working as a part of Shang dynasty bronze casting, the fabrication of models, the use of jigs and molds, cores, ornaments, and Eastern Chou dynasty clay-working techniques in bronze foundries. In addition, the essays review the use of ceramic moulds in iron casting, iron casting, bronze working, and the fabrication of architectural elements (tiles and bricks), and Chhin and Han dynasty architectural ceramics and terracotta warriors and horses. Later ceramic-making techniques (pp. 428-454) elaborate Yao-chou, production during the Thang dynasty, moulding at Huang-pao in the Five Dynasties period, Sung dynasty manufacture, and influences from silver on Chinese ceramics. Other topics include moulds, spouts and handles, faceting, double moulding, and manufacture at Chen-te-chen (production during the Five Dynasties are each summarized).

"Part 5: Glazes" (pp. 455-607) is a lengthy and detailed treatment of the subject with topical, geographical and chronological subdivisions. The eight topical entries begin with "Ash-glazes" (pp. 455-469) under which origins, initial dating, variations in wood ash composition, wood and plant types, ash preparation, Han dynasty partial glazing, taxonomy, early stoneware glazes, southern high potassia glasses and glazes, Vietnamese glazed ceramics, and Bronze Age blackware glazes are considered. In "Coloured glazes, glasses and lead glazes" (pp. 470-488), the authors review colors and textures of Chinese and Near Eastern glazes, oxidation and reduction, titania in Chinese glazes, low-fired glazes and glasses, the use of barium in Chinese glass, "stonepaste" beads, lead-barium glazes, lead poisoning and high-lead glazes in world ceramic history. A subsequent section, "Lead glazes from the Thang dynasty onwards: vessels, tiles and associated wares" (pp. 489-522), documents the use of tiles in Chinese buildings, roofs, manufacturing techniques, vessels, the production and use of lead glazes in several dynasties (notably Thang, Liao, Sung, and Chin). "High-firing lime glazes" (pp. 523-538) presents information on Thang dynasty high-fired wares, the development of southern stoneware glazes, sources of wood ash, Yüeh wares, polychrome lime glazes, the Chhiung-lai and Chhang-sha kilns, low titania glazes, and early Yao-chou wares. One section of this part is devoted to "Northern high-firing stoneware and porcelain glazes" (pp. 539-549), documenting Hsing whitewares and porcelain, the use of magnesium oxide as a glaze-flux, Ting wares, feldspathic Hsing ware, and Kung-hsien glazes. Eight tables provide data on compositional analyses. The essays on "Southern Chinese porcelain" (pp. 550-561) consider Ching-te-chen whiteware and porcelain glazes, limestone as a glaze-flux, Chhing-pai ware, glaze stone, and Ching-te-chen porcelain glazes. "High-temperature coloured porcelain glazes: red, blue and celadon-green" (pp. 563-585) contains information on Ching-te-chen copper-red and monochrome blue glazes, Ming imitations of Sung and Yuan dynasty glazes, Kuan and Ko wares, recipes for Lung-chhuan glazes, Kuan ware, and the production and use layered glazes.

There are seven tables that relate compositional chemistry. The final section, "Classic northern glazes: Yao-chou, Chün and Ju, and their imitations" (pp. 586-607), focuses on northern celadon-type wares, raw materials, use of phosphorous in the glazes, Sung dynasty Yao-chou celadon glazes and bodies, Lin-ju and Chün wares, the liquid-liquid phase separation, origins of Chun glazes, and imitations made in northern and southern China. Eleven tables present chemical compositional data.

"Part 6: Pigments, Enamels and Gilding" (pp. 609-707) has four lengthy sections. The initial set of essays, "Cold-painted pigments: Glass" (pp. 609-633) includes an informative discussion of the paints used on terracotta warriors, the development of colors in glass, and the evolution of fired enamels. Essays on Chinese and Persian over glazes, Ching-te-chen overglaze enamels of the Yuan and Chhing dynasties, turquoise-blue alkaline glazes, potassia-flux glasses and glazes, glaze types and colorants, the occurrence and use of saltpeter in alkaline glazes are included. In "The development of enamelling in "foreign colors" in the +18th century" (pp. 634-652), the authors review later Ching-te-chen overglaze enamels, gold-ruby enamel, the history of enamel use (porcelain, glass, and metal), post-Yung-Cheng enamelling, *famille* rose colors, the use of arsenic as an opacifier, flux balance, and Khang-Hsi period overglaze blue. In the section entitled "High-firing colour: copper, iron, and cobalt" (pp. 653-692), several glazes are documented (Thang dynasty glazes and the use of copper in Chün and Jung-hsien ceramics), copper pigments used at Ching-te-chen, cobalt blue ceramics in China and the Near East, cobalt-bearing glass from Chhang-sha, lead-barria glass, analyses of cobalt pigments (destructive and non-destructive, pp. 668-671), and expositions on the origins of Thang and Liao dynasty cobalt, colorants from south China, underglaze blue in the Ming dynasty, Fa-hua glazes, and metal enamels. Lastly, in "Gilding" (pp. 693-707), the use of metals to enhance ceramics is considered. Among the topics reviewed are golden rims, fired and unfired gilding, overglaze gold, and studies of gilding on Chinese ceramics.

"Part 7: Transfer" (pp. 709-797) provides an extensive review of China's technology transfer to the world and the significance of Chinese ceramics in the context of world ceramic technology. The initial set of essays (pp. 709-718) provides assessments of China's influence on world ceramics and considers technology transfer, export and imitation, and the economic benefits of trade. In a section entitled "Local-technology transfer: the influence of Chinese ceramics in East and South-east Asia" (pp. 719-727), the authors consider (rather briefly), in turn, Korea, Japan, Southeast Asia, Vietnam, Thailand, and Cambodia. With "Remote-transfer: The influence of Chinese ceramics in South and West Asia, and Africa" (pp. 728-739) the geographical assessment turns to South and West Asia, Africa, and how Chinese ceramics inspired West Asian products. The origins of tin-opacified glazes, stone-paste and soft-paste bodies, and decorative techniques linking China and the Near East are reviewed. The next section, "Remote transfer: The influence of Chinese ceramics in Europe" (pp. 740-778) provides essays on European knowledge of China and its

ceramics in the 16th and 17th centuries, missionary accounts, exports and early imitations, French soft-pastes, Meissen porcelain, Saxon porcelain, Continental soft-pastes, British porcelain, John Dwight's porcelain, China clay, Cookworthy porcelain, bone china, soapstone porcelain, Wedgwood's Jasper ware, Petrik's porcelain, and late British hard-paste porcelains. Noteworthy among the essays are an audit of contemporary porcelains and white-glazed earthenwares (pp. 769-772), the decline of Chinese production, the reconstructive transfer through chemical analysis (p. 773), and what has been learned from chemical analysis (p. 778). In "The significance of Chinese ceramics in the context of world ceramic technology in the +20th to +21st centuries" (pp. 779-797), the authors provide 20 essays on a variety of topics including technological developments, advanced ceramic compositions, forming processes, the use of microscopy, applications, refectories, semiconductors and superconductors, domestic products, the evolution and competition of materials, synthetic single crystals, electronic ceramics, ceramic coatings, and amorphous materials.

This monumental and comprehensive assessment of Chinese ceramic technology spans the time frame from the Paleolithic to the present day. There is no comparable volume that approaches this compendium in the scope of its coverage, currency, credibility, and the thoroughness of its documentation. Meticulously researched by Kerr and Wood, it is the largest volume in the *Science and Civilisation in China* series and will remain the standard reference work for decades to come. The present volume is a fitting tribute to Joseph Needham's vision. Speaking only to the topic of ceramic technology, there has been nothing like this published in any language, nor is there likely to be in the near future. For example, compendia such as *Chinese Technology in the Seventeenth Century* by T'ien-Kung K'ai-Wu (translated and annotated by Sung Ying-Hsing, Shiou-Chuan Sun and E-Tu Zen Sun, New York: Dover, 1997), a highly illustrated classic (with 151 woodcuts) published originally in Chinese in 1637, covers agriculture, textiles, mining and metallurgy, chemical engineering, boat construction, and weapons manufacture but *not* ceramic production. Nor does Lothar Ledderose in his magnificent *Ten Thousand Things: Module and Mass Production in Chinese Art* (Andrew W. Mellon Lectures in the Fine Arts, Princeton: Princeton University Press, 2001) undertake the topics of ceramic technology or production. For a discussion of Chinese science and technology, the reader should consult *Chinese Studies in the History and Philosophy of Science and Technology* (edited by Fan Dainian and Robert S. Cohen, New York: Kluwer Academic Publishers, 1996). Kerr and Wood have earned the gratitude of scholars who are concerned with ceramic technology. Their synthesis on Chinese ceramic technology is astonishing and their comprehensive treatise is also a lasting contribution to the history of science.

Iraq's Marsh Arabs in the Garden of Eden. Edward L. Ochenschlager, University of Pennsylvania Museum of

Archaeology and Anthropology: Philadelphia, 2004, x + 285 pp., figures, color plates, index, Price \$39.95 (cloth), ISBN 1-931707-74-X

Reviewed by Charles C. Kolb, Division of Preservation and Access, National Endowment for the Humanities, Washington, DC 20506.

With the restoration of a portion of the marshlands of the Tigris and Euphrates rivers, Iraq's Marsh Arabs (more properly called the Mi'dan), celebrated by the late Wilfred Thesiger (1909-2003) in *The Marsh Arabs* (New York: Dutton: London: Longmans, 1964), are once again newsworthy. Long under threat, their marshes were aggressively drained under Saddam Hussein's regime. More than 90 percent of the of marshes were drained during his regime, in part to punish the Shi'ite Marsh Arabs who opposed him, to provide access to the border with Iran during the Iran-Iraq War, and to divert water for cities upstream. In the dry season, the marshes occupied 8,800 km² and in the spring expanded to 20,000 km². See "The Restoration Potential of the Mesopotamian Marshes of Iraq" by Curtis J. Richardson, Peter Reiss, Najah A. Hussain, Azzam J. Alwash, and Douglas J. Pool, *Science* 307(5713):1307-1311, 25 February 2005 [DOI: 10.1126/science.1105750] <http://www.sciencemag.org/cgi/content/short/307/5713/1307>.

Ochsenschlager, Professor Emeritus at Brooklyn College, was director of excavations at Thmuis and Taposirus Magna in Egypt, Sirmium in Yugoslavia, Shibam in Yemen, and was assistant director at the Sumerian site of al-Hiba (ancient Lagash, ca. 2600-2300 BCE) located in the marshes of southern Iraq. As a part of the al-Hiba research, Ochsenschlager conducted ethnoarchaeological fieldwork from 1968 to 1990. In the current volume, he examines the material culture of three tribes and documents the Lifeways and manufacturing processes employed by the peoples whose ancestors have lived in these marshes for five millennia. The results of that ethnoarchaeological research are carefully presented in fifteen chapters in *Iraq's Marsh Arabs in the Garden of Eden* a scholarly and semi-popular volume that focuses on the ethnoarchaeological question of what the present can tell us about the past. He also documents changes that took place during this 22-year period. The volume is supplemented by 159 figures, 32 color plates, and a five-page double-column index. References to the literature are fully cited as footnotes but there is no separate bibliography. In this assessment, I shall emphasize those chapters that focus on issues of ceramic ethnoarchaeology. Nonetheless, there are some very salient points made about the interpretation of archaeological objects and the need for ethnoarchaeological research. Indeed, anthropologists working in tropical and wetland areas will find much food for thought in Ochsenschlager's essays.

The initial chapter, "In the Garden of Eden" (pp. 1-12), supplies the background to the al-Hiba archaeological excavation and identifies the three contemporary tribes that occupy the region: Mi'dan, Bedouin, and Beni Hassan. The second chapter,

"The People of al-Hiba" (pp. 13-33) provides brief ethnographic summaries of these tribes. In Chapter 3, "Ways and Means" (pp. 34-44), Ochsenschlager reviews the principles of his ethnoarchaeological field methods. The chapter entitled "Mud Household Utensils and Storage Containers" (pp. 45-73, 17 figures) has eight subdivisions. 1) The Cooking and Heating Devices: *mangala*, a mud dish for fire (there are tripod and legless versions); *tabag*, a disk for cooking and baking bread (similar to a Mesoamerican comal); and *tannur*, a conical oven for baking flat wheat bread, or meat and fish. 2) Incense Burners: *tunga*, a handled incense burner, and *mabkhara*, a less elaborate version of the *tunga*. 3) Containers: *mogad*, a dish with interior insloping lug supports; *sahan*, a shallow dish for warming, cooking or boiling or used as feeding or watering dishes for a variety of animals; *tiniya*, a storage vessel without a stand (used for dry products such as rice, barley, wheat, dried fish, spices, sugar, packaged tea or coffee, etc.); and *sidana*, a rectangular storage chest with a stand (utilized to store dry products including rice, barley, wheat, dried fish, spices, sugar, etc). 4) Food Processing and Protection: *michfaya*, a heavy cover (a lid for a *sahan* that keeps animals out of the food); *majrasha*, grain grinders (a socketed double disk rotary grinder); and mortars (various sizes and shapes fabricated of bitumen over a sun-dried mud core). 5) In General Manufacturing Details, the author details collecting the mud, tempering (straw or chaff from the threshing floors) constructing the object, finishing, and drying. With 6) Special Techniques and Variations, Ochsenschlager provides details about the construction of high sidewalls, *michfara* tops and handles, *mangala* legs, *tunga* handles, *mogad* supports, sidewall holes for the *tunga* and *mabkhara*, storage chests, *majrasha*, mortars, and considers forms of decoration. 7) Persistence and Change in cooking and heating devices, incense burners, containers, and food processing and protection are characterized, and the author reports the in 8) Archaeological Evidence for the same four basic categories of utensils and containers.

The subsequent chapter, "Mud Musical Instruments, Toys, Jewelry, and Ammunition" (pp. 74-94, 19 figures), begins with a discussion of Musical Instruments including the *tabol* (drum) and *saffra* (whistle). Toys (animal figures, boats, houses, etc. made by boys and girls for their own entertainment) are well-documented. More than a dozen animals are fabricated by children including some that the children have never seen (lions for example). Anatomically correct human figurines of men and women showing "the mystery of the origin of life" are reported. Other toys include vehicles (boats and wheeled wagons and an occasional tractor), and *khorkhasha* (baby rattles). Mud jewelry is made as replacement jewelry for the dead, since the family jewelry is often the household's total financial resource. Pellet shot for slingshots is also notable. The subheadings of Persistence and Change and Archaeological Evidence each consider musical instruments, toys, and slingshot ammunition. Chapter 6, "Mud Architecture and Ancillary Structures" (pp. 95-110, 7 figures), includes two subdivisions. The first part has a discussion of buildings made of mudbrick, the art of brickmaking, production locales, brick standardization

(three sizes of molds), brick laying, and *pisé* building construction. There are also sections on Persistence and Change and Archaeological Impact. The second subdivision entitled Large Mud Ancillary Structures contains information on mud wall construction, troughs for livestock, sheds and lean-tos, large *tannur*-shaped structures, bed platforms, and concludes with brief essays on Persistence and Change and Archaeological Impact.

With Chapter 7, "Baked Pottery" (pp. 111-128, 12 figures), the author reports that the only baked pottery vessel made in the villages near al-Hiba is the *kuz* used for water or salt storage. In each village, one or two middle-aged women who have a "special talent" for fabricating these handmade vessels made the jars during the summer and sell or trade them to their neighbors. The *hib*, a filter for "polluted water," is made only by professional potters living in larger cities. Ochsenschlager observed local pottery-making during the initial year of his research but was "stunned" to learn that a conflict between the village potters and professionals in the city led to the demise of the peasant craft. The information he presents on pottery-making is based on his initial observations, those of former potters, and his two informants. Making Baked Pottery includes the usual ceramic ethnographic information: collecting mud, adding temper (*coma*, fine hair-like appendages attached to reed seeds, e.g., "cattail fluff"), constructing the vessel (slab-building and adding handles) firing the vessel (a trench firing with dung patties as fuel), and "curing" the vessel. The latter involves wetting the vessel, rubbing mud all over the inside walls into cracks and imperfections, removing the excel, filling the vessel with water, allowing it to sit for several days, then rinsing it with clean water. In Persistence and Change the author notes modifications in temper type, particularly with the use of water buffalo dung and fine chaff (rather than *coma*), although one woman used crushed potsherds. Decoration was also introduced (impressing broken bits of chins, glass, or plastic on the exterior surface and arranged in a pattern), barbotine, and even copying an Early Dynastic pottery motif from an ancient potsherd. There is no information on vessels sizes; however, Munsell color designations are given. In Archaeological Impact, Ochsenschlager considers a series of questions about pottery change, variations in size and form, and the classification of archaeological pottery.

The remainder of the volume concerns non-clay materials and processing, and animal husbandry: Chapter 8, "Mats, Baskets, and Other Objects Made of Reeds and Rushes" (pp. 129-144, 9 figures); Chapter 9, "Reed Architecture" (pp. 145-169, 19 figures); Chapter 10, "Wood, Boats, and Bitumen" (pp. 170-189, 10 figures); Chapter 11, "Bovine Husbandry" (pp. 190-202, 3 figures); and Chapter 12, "Sheep" (pp. 203-215, 6 figures).

Chapter 13, "Village Weavers" (pp. 216-250, pp. 22 figures) provides extremely valuable ethnoarchaeological information about textile production, especially the fabrication of nets and carpet weaving. In Chapter 14, "The Photographs of John Henry Haynes" (pp. 251-269) the author presents and briefly discusses 31 selected images created by Haynes (1949-1910) in 1884

when he served on the Wolfe Expedition in Asia Minor. The originals of the images are housed in the Archives of the University of Pennsylvania Museum of Archaeology and Anthropology and show striking parallels to the ethnoarchaeological data and photographs that Ochsenschlager reports in the earlier chapters of this book. The final contribution, "Death Under Glass" (pp. 270-280, 4 figures), comments on artifacts in museum collections, the form and function of objects, the social value of craftspeople, status, gender and age, climate and fauna, variation and terminology, and culture change. He points out that ethnoarchaeology gives us a better understanding of the strategies employed by ancient peoples and how the archaeologist should employ this information to help solve archaeological problems, look at old material in new and different ways, and discover new possibilities and methods of interpretation. This is a very valuable contribution to ethnoarchaeology and is useful to the professional anthropologist and of interest to the general public.

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Upcoming Conferences

Colleen P. Stapleton, Associate Editor

2005

May 15-19, 8th International Conference on Non-Destructive Testing and Microanalysis for the Diagnostics and Conservation of the Cultural and Environmental Heritage, Lecce, Italy. Abstract deadline: 31 Oct 2004. Contact: Scientific Secretariat, Istituto Centrale per il Restauro (ICR), attn. Marcella Ioele Piazza San Francesco di Paola, 9, I 00184 ROMA, tel +39 06 4889 6270/6233, TFX +39 06 4815 704, e-mail: art2005@beniculturali.it. General information: www.dsm.unile.it/art05.

May 16-20, Archaeological Prospection: Advances for Non-destructive Investigations in the 21st Century, National Park Service, Hopewell Culture National Historic Park, Chillicothe, Ohio, USA. Application forms and more information are available from <http://www.cr.nps.gov/mwac>.

May 23-27, Archaeological Geophysics, American Geophysical Union, New Orleans, Louisiana. Conference information: <http://www.agu.org/meetings/sm05/>.



Jun. 5-10, CANQUA (Canadian Quaternary Association), Winnipeg and Regina, Canada. Contact D. Sauchyn (sauchyn@uregina.ca) or J. Teller (tellerjt@ms.umanitoba.ca), co-chairs. General information: www.mun.ca/canqua/index.html.

Jun. 8-13, 33rd American Institute of Conservation (AIC) Annual Meeting, Minneapolis, USA. General information: aic.stanford.edu/meetings/index.html.

Jun. 28-Jul. 1, Heritage, Microbiology and Science, Portsmouth, UK. Contact: Dr. Alison Webster, HMS Secretariat, email: hms2005@port.ac.uk, tel: +44 2392842072, fax: +44 2392842070. General information: www.hms2005.org.

Jul. 25-29, 11th International Conference on Luminescence and Electron Spin Resonance Dating (LED 2005), Kardinal-Schulte-Haus, Bergisch-Gladbach, Cologne, Germany. General information: www.uni-koeln.de/LED2005.



Jul. 27-29, Human Dispersal, Adaptability, and Disease, Paleopathology Association Meeting, Rio de Janeiro, Brazil, South America. For more information, see <http://www.paleopathology.org/sameeting.html>.

Aug. 28-31, 5th International Bone Diagenesis Meeting, University of Cape Town, South Africa. Abstract deadline: 31 January 2005. Contact: Julia Lee Thorp, jlt@science.uct.ac.za, Convenor & Chair of the Organising Committee. General information: www.cmc.uct.ac.za/conferences/2005/boneddiag/info.html.

Sep. 12-16, 14th ICOM-CC, The Hague, The Netherlands. Contact: Congress ICOM-CC 2005, Floortje Kok, Keizersgracht 497, PO Box 76709, 1070 KA Amsterdam, The Netherlands, tel: +31 20 305 45 20, fax: +31 20 305 45 00, email : icom-cc2005@icn.nl. General information: www.icom-cc2005.org/intro/harikete/.

Sep. 12-16, 22nd International Meeting on Organic Geochemistry, Seville, Spain. Papers sought on "New Trends in Organic Geochemistry", including studies from archaeology, biochemistry, and DNA. Abstract deadline: 7 Jan 2005. General information: www.imog05.org.

Sep. 19-23, 14th Meeting of the Association of the European Geological Sciences, Turin, Italy. Website, <http://www.maegs14.com>. Deadline for on-line abstract submission is May 15.

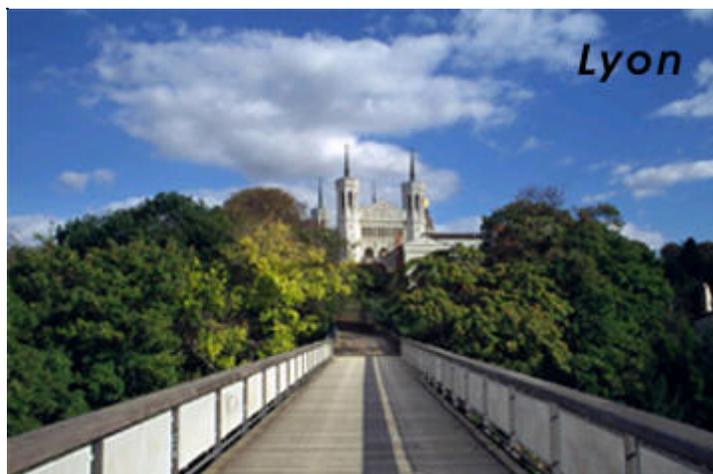
Sep. 26-29, Archaeometallurgy Session, Materials Science & Technology 2005 (MS&T '05), Pittsburgh, PA, USA. The third in a series of multidisciplinary annual conferences held by and for professionals in the metals and materials

community. Sponsored by TMS, the Association for Iron & Steel Technology, ASM International, the American Ceramics Society, and the American Welding Society. Session organizers: Mike Notis, Heather Lechtman, Pam Vandiver, Martha Goodway. Contact: TMS Meetings Services, 184 Thorn Hill Road, Warrendale, PA, 15086; tel: (724) 776-9000, ext. 243; fax: (724) 776-3770; e-mail: mtgserv@tms.org. General info: www.matscitech.org.

Sep. 28-29, Metallurgy in Southeast Europe from Ancient Times till the End of 19th Century, Sozopol, Bulgaria. Abstract deadline: 30 Jan 2005. Union of Bulgarian Metallurgists, 108 Rakovsky Street, 1000 Sofia, phone/fax:(+3592) 986 2964, e-mail: bum@ttm.bg. General information: www.bum.ttm.bg/3thIntSymposium_en.htm.

Sep. 29-Oct. 1, 3rd Forbes Symposium on Scientific Research in the Field of Asian Art, Freer Gallery of Art, Washington, DC, USA. Abstract deadline: 31 Jan 2005. Email: dcsr@asia.si.edu; fax: 202-633-9474. General information: www.asia.si.edu/visitor/dcsrSymposium.htm.

Oct. 25-29, European Meeting on Ancient Ceramics (EMAC 05), Lyon, France. First circular. Contact: EMAC' 05, Laboratoire de ceramologie, UMR5138, Maison de l'Orient et de la Mediteranee, 7 rue Raulin, 69365 LYON cedex 7, FRANCE; tel: 33 (0)4 72 71 58 71, fax: 33 (0)4 78 69 82 31, email: emac05@mom.fr.



Nov. 16-29, Artifacts: The Inside Story, American Schools of Oriental Research Annual Meeting, Philadelphia, Pennsylvania, USA. Please check the ASOR website for membership and participation requirements, <http://www.asor.org>.

CALL FOR CONTRIBUTIONS

The *SAS Bulletin* Editors invite readers to contribute short research articles (1500 words or less), calls for papers and summaries of conferences on archaeological science, relevant news items, and information about jobs, grants, and fellowships in archaeometry. Submissions should be composed using 11 pt. Times New Roman font with full justification. Submit materials electronically to Christian Wells, cwells@cas.usf.edu.

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